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NATIONAL BUREAU OF STANDARDS AUTHORIZATION

HEARING

BEFORE THE

SUBCOMMITTEE ON
SCIENCE, TECHNOLOGY, AND SPACE

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

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ON

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NATIONAL BUREAU OF STANDARDS AUTHORIZATION

TUESDAY, MARCH 6, 1984

U.S. Senate,
Subcommittee on Science, Technology, and Space,
Committee on Commerce, Science, and Transportation,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:35 a.m., in room SR-253, Russell Senate Office Building, Hon. Slade Gorton (chairman of the subcommittee) presiding.

Staff members assigned to this hearing: Cheryl Coodley, professional staff member; and Steven Flajser, minority professional staff member.

OPENING STATEMENT BY SENATOR GORTON

Senator Gorton. Welcome to our hearing this morning on the plans and programs of the National Bureau of Standards for fiscal year 1985. The National Bureau of Standards is an agency with an extremely broad mission relevant to nearly every national problem area and every economic sector. Many of us take for granted the measures, standards, and technologies developed at NBS which affect us daily. For example: The neon tube was first demonstrated at NBS; NBS first made it possible for radios to operate on household current; the first large scale computer in the United States was designed and built at NBS; and the performance standards for flammability of children's sleepwear and for residential smoke detectors were developed by NBS scientists.

At today's hearing we will examine closely the proposed budget for fiscal year 1985 for the National Bureau of Standards. There are substantial budget decreases as well as several new initiatives in the National Engineering Laboratory. Both the Center for Building Technology and the Center for Fire Research are proposed for elimination. In addition, the Institute for Computer Sciences and Technology is proposed for drastic reductions.

New initiatives at the Bureau include a role for the Bureau in the rapidly growing biotechnology field, development of cold neutron research on materials, and the first stage of purchase of a supercomputer to be used by both NOAA and NBS.

We will scrutinize carefully those proposed changes, assess their impact on the overall mission of the Bureau, and make our recommendations with respect to the budget for NBS for fiscal year 1985.

We are pleased to have with us today, in addition to Dr. Ernest Ambler, Director of the Bureau of Standards, several outside witnesses who will aid in the evaluation of the Bureau's proposed budget. I would like to welcome Mrs. Shirley Prutch, vice president and general manager of Martin Marietta Data Systems; Mr. Richard Wolfe, president of the National Conference of States on Building Codes and Standards; and Mr. Les Huntley, of John Fluke Manufacturing Co., Inc.

Mr. Huntley, I know you have traveled all the way from my home State of Washington, and I want to extend a special welcome to you.

We will begin with an overview from Dr. Ambler, Director of the Bureau.

And at this point in the record we will enter an opening statement from Senator Hollings who is unable to be with us today.

[The statement follows:]

OPENING STATEMENT BY SENATOR HOLLINGS

Mr. Chairman, traveling the width and breadth of this nation as I have for the past year, one gets the distinct impression that the majority of Americans are just about fed up with their federal government's fiscal policy. They are sick and tired of waste, irresponsibility, and the ballooning federal deficit. And they are adamant in their demand that their representatives in Washington do something about this problem before it brings us to the point of economic disaster.

But despite their growing impatience, the American people have not lost sight of the fact that government must continue to play an important role in certain sectors of our society. They understand that, in many instances, only the federal government has the capacity to make the necessary investments in the future of our people, to protect our freedom from tyranny, and to guarantee equal opportunity to the least fortunate of our society.

There's absolutely no reason in the world why we can't provide these types of programs and still work to eliminate the federal deficit. What we in Washington have to realize is that we must share the responsibility to succeed, rather than go about pinpointing the blame for failure.

And this is why the Administration's approach to the 1985 budget authorization for the National Bureau of Standards (NBS) perturbs me so.

First, however, let me just say that I am pleased at the overall increase in the Bureau's budget from last year. The Bureau, as its name suggests, plays a central role in setting standards and measurements for both science and industry. It has an illustrious 83 year history and is now emerging as a leader in establishing voluntary standards in the burgeoning computer industry. Through its many programs, the National Bureau of Standards is making investments that will pay off with real dividends for our industrial and technological future.

But upon closer examination, the proposed NBS budget is disturbing—disturbing not only because of the programs that are eliminated, but because it reveals that the Administration is choosing to persist with its contemptibly low strategy of trying to thrust culpability for the budget deficit solely on the Congress.

I know this is true because the Administration's plan to eliminate two important NBS programs and drastically reduce a third makes absolutely no sense. The three programs of which I speak have an impact on every American citizen, and thus are at least as important as the many other NBS programs which have been increased.

First, the Administration proposes doing away with the Center for Five Research (CFR). The CFR performs basic research on fire and fire protection methods in an effort to end America's standing as the world leader in fire fatalities.

Second, the Administration would eliminate the Center for Building Technology (CBT). This is the national center that sets the standards for building codes and building safety and provides guidance for state and local governments. It was the CBT that led the investigation of the Hyatt-Regency disaster that claimed more than 100 lives in Kansas City three years ago.

Third, the Administration wants to cut back the funding for the Institute for Computer Science and Technology. After a rocky start, the Institute is now playing an increasingly important role in setting national and international computer standards, and it is beginning to gain recognition from business and industry.

Does the Administration feel these programs serve only special interests and thus are unworthy of federal support? Are fire safety, building safety, and computer technology superfluous or unimportant issues that do not deserve government attention?

I do not believe these are the real reasons the Administration is proposing the cutbacks. Rather, I believe the Administration is baiting the Congress. It knows we have the foresight and determination to restore funding to these important programs. And when we do, Administration officials can point in our direction and say "See? We've tried to cut the deficit. But that naughty Congress isn't cooperating."

So you see, this is part of a plan to divert attention from the Administration's bloated defense spending proposals and its failure to stop the revenue hemorrhage. It's an escape hatch, if you will—a plan which enables the President to point fingers and assess blame. What a shame it is that such worthy and vital programs have become the pawns in this silly little game, while the real problem—reducing the deficit—is left unsolved.

This is distressing to me. I will be following the testimony of the witnesses very closely. Sure, we must address the budget deficit question. But the real answers lie within bounds far beyond the confines of this hearing room. I guarantee you this Congress will speak to the policies which have brought on this huge deficit. But in the meantime, let us not make ill-advised cuts in programs that affect all American citizens.

Thank you, Mr. Chairman.

Senator GORTON. Dr. Ambler, you may proceed.

STATEMENT OF DR. ERNEST AMBLER, DIRECTOR, NATIONAL BUREAU OF STANDARDS, DEPARTMENT OF COMMERCE, ACCOMPANIED BY RAYMOND G. KAMMER, DEPUTY DIRECTOR; DR. DONALD R. JOHNSON, DIRECTOR, NATIONAL MEASUREMENT LABORATORY; DR. JOHN W. LYONS, DIRECTOR, NATIONAL ENGINEERING LABORATORY; JAMES H. BURROWS, DIRECTOR, INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY; AND DR. DARRELL H. RENEKER, ACTING DIRECTOR, CENTER FOR MATERIALS SCIENCE

Dr. AMBLER. Thank you very much, Mr. Chairman.

I am pleased to request authorization of appropriations for the National Bureau of Standards for fiscal year 1985. I would like to introduce my colleagues who are with me at the table: the Deputy Director, Mr. Raymond Kammer, on my right; the laboratory directors, Dr. Donald Johnson, Director of the National Measurement Laboratory, on the far left; Dr. John Lyons, Director of the National Engineering Laboratory on my immediate left; and Mr. James Burrows, Director of the Institute for Computer Science and Technology, next to Mr. Kammer; and on the far right, Dr. Darrell Reneker, who is Acting Director of the Center for Material Sciences.

We are requesting an appropriation of $126,062,000, a net increase of $10,344,000 over fiscal year 1984. This request includes cost-of-living increases and built-in adjustments of $7,488,000; program increases of $17,874,000; and program decreases of $15,018,000.

In fiscal year 1984, we will receive approximately $80,300,000 for reimbursable work done for Federal agencies and for services provided for a fee.

In fiscal year 1985 we are for the first time in many years requesting funding for four important new initiatives. The administration has supported these proposals because it is clear that this Nation must plan for the future, and the National Bureau of Standards must provide the measurement foundations that will be needed by U.S. science and industry.

We are requesting an increase of $1,500,000 that will allow NBS to build a full-scale cold neutron source at our research reactor. Cold neutron beams are a new and important frontier in materials research. Applications exist in virtually every branch of materials science. For example, they permit researchers to measure the internal structure of advanced experimental ceramics that could be used to increase the efficiency of automobile engines by 30 percent.

The United States is far behind European countries which have invested more than $140 million in cold neutron facilities. Japan has also launched a major research effort in this area. The NBS reactor is the only one in the United States that was specially designed to accommodate a large cold source needed for this type of research.

The proposed multipurpose, multiuser addition will provide NBS, other Federal agencies, private companies and universities with an important capability not otherwise available—and at a fraction of the cost of other alternatives. It will permit NBS and other U.S. organizations to exercise world leadership in this field.

If NBS is to continue to be a world class research organization for the Federal Government, we need a first class computing system. Mathematical modeling of complex systems is the wave of the future in scientific and engineering research with widespread applications across all fields of science and technology. For the past several years, NBS has been working with the environmental research laboratories of NOAA to secure a new central scientific computer system that will serve the needs of both agencies. The $8,900,000 increase requested will permit us to award a contract for a class VI supercomputer at NBS.

Our third initiative is an increase of $2,500,000 to address the tremendous opportunities for improving quality control in U.S. industry. Working closely with industrial and Government experts, we have identified five measurement areas that are critical for the high technology, defense, manufacturing, and health industries. If advances are not made in these areas, a large and diverse segment of U.S. industry, including semiconductor manufacturers, aerospace and defense firms, and those seeking to develop fusion energy sources, will be hindered in their efforts. Improved measurements are also needed for quality assurance in radiation therapy and protection.

We are requesting $3 million for biotechnology research. This comes after a thorough analysis of the biotechnology field and its measurement needs. As the congressional Office of Technology Assessment recently pointed out, the United States has a commanding technical lead in biotechnology, and the prospects for economic growth are promising. But the worldwide competition in this field will be stiff.

Biotechnology is entering a stage which will require a strong scientific basis and a diversified and multidisciplinary effort. Many firms already have approached NBS for help. NBS has well-established expertise in the closely related and rapidly growing area of clinical chemistry. A $3 million increase will permit us to build on our experience and provide information that will assist U.S. industry in developing new and improved products and solutions for the complex problems facing medicine, pharmacology, agriculture and other industrial fields.

Finally, the budget proposal includes a $2 million increase that will permit us to replace the obsolete telephone system at the Gaithersburg site. Replacement parts and equipment for the current system are no longer manufactured. Repairs are made with reconditioned or surplus parts. This means that even simple maintenance of the current system is becoming increasingly burdensome and costly.

The budget calls for decreases of $3,174,000 in building research and $5,141,000 in fire research. These reductions will eliminate both centers. The budget includes a reduction of $5 million in the Institute for Computer Sciences and Technology. The measurement assurance program and the national voluntary laboratory accreditation program are to be decreased by $1,703,000.

Proposed program reductions are made in order to focus our resources in areas that do not overlap with State and local or private sector responsibilities. Fire safety and building performance are the responsibility of State and local governments. Thus, it is our belief that the cost of necessary research for these activities should be borne by them.

In the case of computer standards development, we propose to concentrate our efforts on international activities and to rely on the voluntary standards process for addressing domestic ADP standards needs.

With respect to the Measurement Assurance program and the National Voluntary Laboratory Accreditation program, the proposed reductions are in keeping with our belief that when direct beneficiaries of services can be identified, they should bear the costs.

Mr. Chairman, before closing I would like to point out that our budget request does not tell the whole story about the level of research and activities at NBS. National Bureau of Standards programs are enhanced in a significant way by contributions and the collaborative work of researchers in industries, universities and other organizations. The value of these cooperative relationships does not show up in our budget proposal, but they are an important ingredient in the mix of research we conduct and the services we offer.

Our automated manufacturing research facility which you recently visited typifies this kind of mutually beneficial sharing of resources and facilities. The AMRF is a unique research test bed we are using to develop the quality control techniques and software interface standard needed for the fully automated factory of the future. The facility has heavy involvement with industry, universities and other Government agencies. If the Congress approves, we can foresee similar collaborative and cooperative efforts at our cold neutron source facility.

We at NBS have a record of performance and cooperation that I am proud of. I ask your support for our new proposals, and we will be glad to answer any questions you have.

Senator GORTON. Thank you, Dr. Ambler.

We will start by dealing with two programs proposed for termination, the Centers for Fire Research and for Building Technology.

This is the second year that the administration has proposed terminating these centers. Last year this committee and the Congress rejected the proposed terminations and restored funding at fiscal year 1983 levels. It is now 1 year later.

Do you have any studies, documentation, or written analysis which supports your contention that the private sector and State and local governments can or will perform the type of basic fire and building research which would be terminated pursuant to this budget?

Dr. AMBLER. No, we have no substantially new information of that kind from what we had last year. We have been working toward finding out if there are interests in the private sector or State and local governments that would be able to use the facilities and conduct their own experiments there, but that is about as far as we have gone.

Senator GORTON. Mr. Wolfe has not testified yet, Dr. Ambler, so I am not going to ask you to comment at this point on the interesting survey results he will share today about the ability of State government to do the research now performed at CFR and CBT.

I would, however, request that you read that analysis and that you comment on it in writing, if you will.

Dr. AMBLER. To the committee, sir?

Senator GORTON. Yes.

Dr. AMBLER. Yes.

[The material referred to follows:]

U.S. DEPARTMENT OF COMMERCE,
NATIONAL BUREAU OF STANDARDS,
Washington, D.C., March 22, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: As you requested, I have reviewed the testimony of Richard E. Wolfe, President of the National Conference of States on Building Codes and Standards. His basic conclusion is that the States cannot take on responsibility for building and fire research because they cannot afford it. He also reports that the States regard building and fire research a Federal rather than a State function.

It seems to me that the ability of the States to afford building and fire research is the sort of priority decision attendant to the formulation of any budget. To date, the States have not had to pay for the results of this work. It seems natural to me that they would resist adding items to what is probably an already difficult budget priority list. As to whether building and fire research are Federal or State functions, the presence in all cases of responsibility for enforcement of building and fire codes at the State and local level creates an arguable case that the research for these activities should also be at the State and local level.

Sincerely,

ERNEST AMBLER, *Director.*

Senator GORTON. As you note in your budget justification, CFR does a lot of work for other agencies on a reimbursible basis.

If CFR is terminated, where will those agencies take that work?

Dr. AMBLER. That is an aspect that we have thought about a fair bit. It would be our intention to continue the work that we have undertaken to do but not to renew it. The basis for coming to that conclusion is that I have always felt it is not a very good thing for a laboratory to run a program completely on a reimbursible basis. You lose control of the long-term directions, and you tend to become a job shop, which I do not think the National Bureau of

Standards should become. So I think those programs, over the course of time, will terminate.

Senator **Gorton**. Is it likely to be more costly to contract such work from private sector sources?

Dr. **Ambler**. If you agree, I would ask Dr. Lyons to answer that question. He is more directly in charge of the program.

Dr. **Lyons**. Senator, there are some aspects of the other agency work that could be done, I think, at Underwriters Laboratories, at Factory Mutual Research Corp., or at one or two other places. They have the ability to do certain of the more routine kinds of work, and I do not know that the cost would be significantly larger. There are some things they are not currently geared up to do, and they would have to expand their facilities.

Senator **Gorton**. If the Center for Building Technology were terminated, what would happen to earthquake research, for example, the development of seismic design and construction provisions, at the center? Is there any other Federal agency or any State agency which has indicated the ability and willingness to perform that research, and are special facilities needed to perform it?

Dr. **Lyons**. The work that we do with our STRS base is largely structural engineering, and we have put together a facility at NBS which is referred to in the business as a strong back or a reaction wall facility. It is unique, and others would have to provide such a facility to do some of that work.

There are other aspects of the work that we are managing on other agency funds for FEMA, and they would have to find another group to do that for them.

Senator **Gorton**. How much would it cost to replace the facility?

Dr. **Ambler**. We would like to supply that figure for the record, if we might, Mr. Chairman.

Senator **Gorton**. That is perfectly appropriate.

[The information referred to follows:]

The cost of duplicating the NBS earthquake research facilities would be approximately $16 million. The facilities include: Large scale seismic test facility; three directional testing machine and support facilities; geotechnical laboratory and field testing capabilities; and staff office space and computational equipment.

Senator **Gorton**. Dr. Ambler, you spent some time in your written testimony describing the accomplishments of ICST, both internationally and in the domestic arena. You mentioned its laboratory efforts with regard to artificial intelligence, which is a matter of considerable interest to this committee and to the Nation. According to a recent study by the International Data Corp. in 1982, the Federal Government spent $3.6 billion in data processing equipment and services, and a total of $21 million for information technology. Over the next 3 years, a 20-percent annual compounded growth rate in the Federal market for information technology is expected, and I guess you are even part of that in respect to another part of this budget request.

Nevertheless, you are proposing that ICST's authorization be slashed to half of what this committee authorized last year.

What would be the impact of that $5 million reduction in the ICST budget on the procurement of Federal computer systems?

Dr. **Ambler**. Well, the thing we would concentrate on with the budget that we are requesting would be the activities in the international area. We feel that is of tremendous importance in many respects for the economy and industry of this country. So we feel that we should concentrate on that. We are active there and I think are doing very well.

For the other aspects, the other provisions of the Brooks Act, consulting services for Federal agencies and for Federal information processing standards, we would have to rely much more heavily on the private sector. For example, in the standards area we would have to rely on the private voluntary standards writing bodies for that work. For consulting, they would have to go elsewhere, and maybe Mr. Burrows would have some ideas of where that would be.

Mr. BURROWS. In the standards arena, I do not know of anybody who would replace us in terms of the will and the desire to get standards out, but the voluntary standards arena is the arena in which standards are made, and I think in that area we would just not be in the American national standards business.

Senator GORTON. Is there a specific organization in the private sector that will be able to take the lead in coordinating and communicating with Federal agencies to determine the need for Federal standards and guidelines?

I take it your answer is no.

Mr. BURROWS. I know of no such organization.

Senator GORTON. Last year we heard testimony that ICST's work on ADP standard-setting and in the technical assistance to other Federal agencies resulted in substantial savings to the Federal Government.

Do you have any statistics that would indicate whether that is true or not?

Mr. BURROWS. Yes, we do have both before the fact estimates and after the fact surveys.

Senator GORTON. Could you get those to us?

Mr. BURROWS. Yes, we could.

[The information referred to follows:]

Cost-benefit studies conducted for ICST have identified significant benefits that can be expected to result from the development and use of Federal Information Processing Standards (FIPS).

More than $200 million in benefits over a 5-year period were identified in a 1981 assessment of seven planned Federal Information Processing Standards. The standards analyzed were for computer based message systems, flexible disk file and format structures, network high level protocols, local area networks, storage module devices, password use, and I/O channel level disk devices. The benefits identified included reduced procurement costs, improved competition, and reduced personnel costs, and improved security. Summary results for these studies are attached.[1]

A 1983 study identified $72 million in net benefits over a 10-year period resulting from the use of a revised standard for the programming language COBOL. These benefits will result principally from improved productivity of programmers who develop and maintain COBOL programs.

A preliminary cost-benefit analysis of a planned Data Dictionary System (DDS) FIPS shows net savings of more than $120 million over a 5-year period. These savings will result from reduced costs and improved productivity associated with the procurement and use of a standard data dictionary system.

ICST has conducted a few surveys of the utilization of FIPS by Federal agencies. These surveys indicate significant utilization of FIPS. Two-thirds of the Federal ADP installations use FIPS software documentation guidelines.

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[1] The attachments are in the committee files.

Senator GORTON. Dr. Ambler, as you know, Mrs. Prutch, chairperson of the ICST evaluation panel, is here today to testify on ICST. I do not think I will be preempting her testimony if I ask you simply to comment on the most recent evaluation panel report.

Did the panel recommend that ICST discontinue its domestic activities or have a cut in its budget?

Mr. AMBLER. No, sir.

Senator GORTON. Do you have any other comment that you would like to make on that report?

Mr. AMBLER. Yes. In addition to the report, it is a custom that I meet with the chairman of the panel after they have concluded their 2 or 3 days at the National Bureau of Standards in a face-to-face discussion. We were both very optimistic about the way the programs in ICST were being conducted. I felt very pleased about a number of things over the last 2 years, not the least of which is that the ICST have been basing their work more and more on laboratory test beds, as it were, more laboratory-based activity, to enable the people that work in ICST to get hands on experience. If they are going to advise other people, if they are going to take leadership in standards areas, they have absolutely got to have that experience. Besides, it is more consonant with what I believe things at the Bureau of Standards should have. They should have a research activity. So ICST has been very successful in doing that, and that has made a very big difference to their program, and the evaluation panel saw it that way, too.

Another thing that ICST has been able to do is in working with the voluntary standards groups. In the past they have largely worked with the manufacturers of computers and associated equipment. They have involved to a very great extent users of equipment and gotten them to participate in the standards-writing groups, for example, insurance interests, bank interests, and that has made a very big difference. It has brought a completely different point of view to and, I think, put more zip into the voluntary standards-writing process. It is one of the reasons why I think we have—we can have more hope than we had in the past that the voluntary standards process will be forthcoming with the kind of standards that we adopt as Federal information standards in the future.

And as I recall, those were the two main topics of conversation, and it was as very upbeat conversation.

Senator GORTON. But you are not wildly happy to be here defending this particular budget request, are you?

Dr. AMBLER. Sir, it is a very difficult situation. I am faced with the difficult situation because the National Bureau of Standards is a laboratory. A laboratory has to be moving into the new areas. It has to be planning to meet the demands of the future. We have to do this and at the same time show restraint by cooperating with the President and his responsibilities in presenting a budget to Congress, and this is the way it all comes out when we apply those criteria.

Senator GORTON. On another subject, measurement technology transfer programs are described in your budget as the primary means by which NBS transfers its developed measurement techniques, standards and data to industry, universities and Government. Users already pay all but the R&D costs associated with these programs.

Have you conducted any studies or surveys to determine whether users will be able or willing to pay R&D costs in addition to the user fees already imposed?

Dr. AMBLER. Dr. Johnson can answer that question.

Dr. JOHNSON. Yes, Senator, we have. We have at the request of this committee and the House committee increased our prices in the measurement assurance program area this fall. We do not have enough data on that price increase to report to you yet, but we promised to report to both this committee and the House committee on the first of May and give you a rather thorough analysis. We do have fairly extensive data in the standard reference materials area where we have been increasing our prices steadily over the past 5 years. We will be able to provide you with a fairly complete analysis.

Senator GORTON. Do those price increases have a pattern of effects that indicates that certain categories of users are more likely to stop or to restrain their use than others will?

Dr. JOHNSON. Yes, sir, they do. First of all, it is pretty clear that users are quite willing to pay the costs that are associated with the delivery of the services to them, but they are rather unhappy about being charged for the cost of R&D necessary to develop services.

If we raise our price at a rate which is roughly commensurate with inflation, most large companies are able to compensate for that increase. Many of the small companies are very slow in compensating for it. Small customers such as State and local governments, find it very difficult to deal with price increases.

So as our prices increase over a long period, we find a difference in the mix of the market. Smaller customers are steadily dropping out. It is clear that there is a limit to how much we can charge and still serve our small customers

Senator GORTON. What would be the average percentage of increase that would be caused by incorporating R&D expenditures into the user fees?

Dr. JOHNSON. Well, sir, if you look at a typical calibration service, it costs about $500,000 to do the R&D to set up a new calibration service. Our current annual income for a given calibration service is about $25,000, charging the customers just for the cost of delivery. I think you can see there is a twentyfold difference, and if we were to roughly double the prices of our calibrations, we would expect to recover those R&D costs over a period of 10 years. I think our data already show that the customers would lengthen their calibration intervals, they would reduce the amount of service they buy from us. We would simply not recover those costs. We would not be serving our customers as we are now.

Senator GORTON. Thank you.

Dr. Ambler, now I will turn to the three substantive new initiatives, beginning with process quality control.

Your budget justification states that the process quality control initiative was "identified by national organizations and endorsed by panel of industrial and Government experts."

What are these organizations, and who are the industrial and Government experts?

Dr. **Ambler**. There is the National Conference of Standards Laboratories, the Council for Optical Radiation Measurements, Conference of Radiation Control Program Directors; and the requests from various professional societies. In addition to those specific organizations, almost a way of life at the National Bureau of Standards is that we are constantly interacting with the private sector, either directly, face-to-face, or on the telephone, or through workshops. We hold about two workshops a week where developments and measurement requirements are discussed so that we have a very wide source of information on this subject.

Senator **Gorton**. What are the views of the NBS statutory visiting committee and the appropriate evaluation panel on this initiative?

Dr. **Ambler**. They strongly support this initiative.

I might say that this initiative is one that I have tried many, many times and it is—it is a very difficult thing to bring all the way to Congress. I am very happy that I have been able to get it through this year. And the reason is that we do do a lot of this work. The constant question I am asked is "Dr. Ambler, you have so many million dollars in this line item for the budget, why can you not do it out of that?" I have been asked that year after year after year. And absolutely, I must state that it is not possible continually. When you are dealing with technology the way the National Bureau of Standards is, there are certain things you absolutely cannot stop, and at the same time, there are new things you must do as science develops, as technology develops. We have reached a critical point where we do need to get funding to take on these new tasks.

So I think everybody who has interacted with the Bureau such as the organizations we mentioned favor this proposal.

Senator **Gorton**. Your budget justification states the Defense Department is among the user groups which need this initiative.

To what extent will DOD help defray the cost of, or pay for, the work?

Dr. **Ambler**. We are pursuing, independent of this budget request, Mr. Chairman, negotiations with DOD. For other and related measurement areas, they do fund us already. The total funding for R&D of this sort is $24 million in all kinds of contracts.

Senator **Gorton**. Does that $24 million cover the entire cost of everything you do for DOD?

Dr. **Ambler**. That is the total funding that we get from DOD for R&D in all kinds of areas, but they all tend to be measurement related.

Senator **Gorton**. But my question is, does that $24 million cover all of the costs of engaging in that R&D, or are you having to supplement it?

Mr. **Kammer**. Sir, it really does not cover the full cost. The reason the Department of Defense comes to us is because we already have an expertise, and of course, we have that because we have a base program.

Dr. **Ambler**. I would add that we are negotiating. In fact, we have a senior member of the National Bureau of Standards who is assigned to work at the Pentagon to analyze the measurement problems that are going to be coming up with the new systems that are likely to be deployed. So we are trying to work as closely with the Defense Department as we can.

Senator GORTON. If it is determined that you are not going to be funded for all three of your proposed new initiatives, which one or two would drop out? That is to say, what is your one, two, three priority?

Dr. AMBLER. Well, sir, in arriving at this budget, there has been, as you can imagine, a great deal of discussion.

Senator GORTON. Even some anguish, I imagine.

Dr. AMBLER. Yes, sir. What we have tried to do is to identify areas where we feel we can make an important contribution. Technical work that we will do in each of these areas is different, the clientele is different, the support that it gives to manufacturing and industry is different, and I do not really feel that I should single out one from another. They are all very important.

I think the most, I would submit, the most constructive thing we can do with this committee, sir, is to make it clear who benefits and what the consequences would be, what we would do, and discuss the facts, and——

Senator GORTON. That is a most diplomatic and nonresponsive answer, Doctor, and by that do you mean that if we determine that we must prioritize and drop some of them, that you do not wish to participate in that decisionmaking process?

Dr. AMBLER. I think that what I am saying is that for me to try to do that here and now is perhaps not the best way to do it. We stand ready to work with you and your staff as you try to make up your mind.

Senator GORTON. Fine, that is a reasonable answer to the question.

Doctor, I see that one of your new initiatives is the cold neutron prototype requested at a level of $1.5 million.

Can you give us an idea of what the likely request will be over the next several years?

Dr. AMBLER. Yes, sir. This $1.5 million is to deploy the cold—well, to fill the space in the reactor that was designed for the cold neutron source, and, to the limited extent we have instrumentation on the floor of the reactor, to use it. But to take full advantage of this as a national facility, we would need an extension of the building and experimental hall with a large number of ports so there could be a large number of users.

Now, the cost of that is not contained in this budget, and the total cost of that is, in addition to the $1.5 million, $23.9 million. And in addition to that, then, there would be a continuing request of $4.2 million annually for operating expenses.

Senator GORTON. Do you have the option of modifying this initiative by using the $1.5 million to enlarge your facility and still perform advanced research?

Dr. AMBLER. And still perform, sir?

Senator GORTON. Advanced research.

Dr. AMBLER. To the extent that the research can be conducted on the instruments we already have, we can do that. But that would be a very limited use of this valuable research tool, and it would not be taking full advantage of it and allowing industry and others to come in and use it.

Senator **Gorton**. One of the major criticisms of DOE's National Center for Advanced Materials is that no input or participation was solicited from the materials science community during the planning stages of that project.

How much input did you solicit from the materials community and from researchers who would be likely to use this facility, and does your proposal reflect that input?

Dr. **Ambler**. Yes, sir, a great deal.

Mr. Kammer has some details on that, sir.

Mr. **Kammer**. Sir, we are currently participating with a committee convened by OSTP and chaired by Frederick Seitz whose objective is to prioritize materials sources. In addition to that, we have participated in a subcommittee of the National Academy of Sciences which just released a report called "Current Status of Neutron Scattering Research Facilities in the United States." This committee concluded that the idea that we are proposing is a good idea. In addition, we have approximately 200 outside users that come through the reactor each year, and this includes Exxon, NIH, all manner of users. They have been kind enough to give us their thoughts.

In addition to that, we convened our own panel made up of members we judged to be representative of the materials community, and they have just finished giving us a report in which they have helped us with our design and the nature of the technical facilities.

Senator **Gorton**. Dr. Ambler, your proposal in the biotechnology area is for $3 million. I understand that you are proposing a joint NBS-University of Maryland Technology center.

How does the request relate to the center? Are they inextricably joined or are they separable?

Mr. **Ambler**. They are not inextricably joined; they are, of course, related. We would propose to go forward with the University of Maryland, and I might add, also local industries—there are two already, and a third is locating in that area—with what we have already. This is not a very big effort, but it is an important one. Obviously this initiative would enable us to do more, and it would make our participation bigger and more meaningful in that center.

Senator **Gorton**. Would you describe the planning process for this initiative?

Dr. **Ambler**. This, the initiative proposed in the budget, sir?

Senator **Gorton**. Yes.

Dr. **Ambler**. Yes.

Dr. Johnson will speak on that.

Dr. **Johnson**. Yes, sir. We began a very serious planning effort in the biotechnology area in about 1980. At that time NBS had a centralized planning staff, and we had that staff focus on several new technology areas. They identified biotechnology as being an area that was going to be important to the economy of the country in the future, and certainly would be an area that NBS must be prepared to serve. And the planning staff has, during the 4-year period since they began, generated a series of reports. Those reports focus on the NBS role in biotechnology, on the need for instrumentation, and on other considerations.

We have also worked with a large variety of people from private industry. We have had a number of people from the private sector come to us and ask us for help in that area. All of these things have guided our planning process. We have been involved in clinical chemistry and related areas for many years, 15 or more years, and we market standard reference materials, about 80 of them at the present time, in clinical chemistry, nutrition and other areas of that sort. So we have a very close contact with the community that is involved with the development of biotechnology.

We understand, I think, their measurement problems very well, and we have laid out a program.

Senator GORTON. Is the focus of the program measurements?

Dr. JOHNSON. The focus is on measurement science, the development of tools for biotechnology, measurement technology, standard reference materials, and standard reference data.

Senator GORTON. Have you picked the University of Maryland primarily because of proximity? How are your activities in this program going to be integrated constructively with efforts of what I gather are several hundred small and large companies in biotechnology across the whole country?

Dr. JOHNSON. Well, our employees in this area are primarily physicists and chemists, and we will be carrying out work that is related to measurement technology development. We need collaboration with biologists; we need access to laboratories where biological work is going on. The University of Maryland is close to us logistically. They have some very good people in the areas that are relevant to the work that we will be doing. They complement our staff and do not duplicate our facilities. So there is a big advantage to us. We are intending to couple very closely with a wide variety of different industry organizations.

Senator GORTON. How are biotechnology and the processes used in it significantly different from other industry needs? In other words, why is it necessary for NBS to have a specifically unique program in this field?

Dr. JOHNSON. Well the general problem that people in industry are running into is that the molecules that they are looking at are very large ones. The systems of molecules are very complex. In most cases, when one carries out a biological experiment and generates some end product, that product occurs in a very complex organic chemical mixture. The measurement problems are very severe, and it is really necessary to develop new techniques that are not now currently available to deal with those complex mixtures.

So I think the problems there are unique and they require a special focus which we do not now have.

Senator GORTON. Thank you.

Doctor, the Bureau has requested $2 million to be used primarily to replace the existing telephone system with an end-to-end digital switching system to allow simultaneous voice and data transmission over the same wires.

Does NBS currently have a technological system in place which permits data transmission?

Dr. AMBLER. Yes, sir, we have a data net.

Senator GORTON. Is that existing system fully utilized?

Dr. AMBLER. It is not fully utilized, no, sir.

Senator GORTON. How does the data capacity of the existing system compare to the Bureau's needs?

Dr. LYONS. I think, Senator, the thrust of your question is whether or not the end-to-end digital telephone system is duplicative of the NBS net. The answer is no. The kind of data connections that one can get with the proposed telephone system is not the same as you can get with the NBS net. The NBS net was designed to connect computers to computers. What we are saying that you can do with the telephone system is to use modest sized personal computers to plug in the back of a telephone, but we are not talking about the kinds of data movement that you get with the NBS net. So they are complementary; they are not duplicative.

Senator GORTON. One will not substitute for the other?

Dr. LYONS. No. The new one is a telephone system. It just has the advantage that you can plug personal computers into the back end of certain telephones.

Dr. AMBLER. If I might add to that, Mr. Chairman, the discussion of using the telephone system for data net is really one of serendipity and of taking advantage of our proposal to do this. The real reason for requesting this in the first place is that the present telephone system is old. I am very proud of the site and the buildings at the National Bureau of Standards. I think we keep them well. But we forget they are 20 years old, and a lot of things, like machinery, are wearing out, and you may be hearing more about that in future years, and that is certainly true of the telephone system.

If I may just give you some numbers, the number of telephone repairs increased from 700 in 1981 to 1,200 in 1983, and if this trend continues, there could be total system failure by about 1985.

Senator GORTON. I am a little bit confused now. I was just told that this new system is not going to substitute for what you have now but be in addition to it. Under those circumstances, are you not going to have major repair costs anyway?

Dr. AMBLER. The telephone system that we are proposing would have the capability to be used as a data system, but its main purpose would be as a telephone system, and I was speaking in the context not of the data net, but the telephone.

Senator GORTON. Is the $2 million a full cost or a down payment?

Mr. KAMMER. Sir, the full cost of the system would be $4.9 million.

Senator GORTON. Would you expect that over a 2-year period or 3 or what?

Mr. KAMMER. With this appropriation of $2 million, that would be a lump-sum payment, and we would take the money that we currently spend for leasing telephones, which is about $666,000, and over 7 years would repay the remaining part that we owe. So we have a 7-year lease for the purchase of the remaining part of the system.

Senator GORTON. Thank you.

Doctor, I am moving now to the subject of the class VI supercomputer which you propose both for the NBS and for the Environmental Research Laboratory at NOAA.

What kind of computing power does NBS currently possess?

Dr. LYONS. We currently have a central computer, a Univac 1100/82, which we have been leasing for 2 years.

Senator GORTON. What are the specific applications that justify such a large expenditure of funds on large-scale computing equipment?

Dr. LYONS. The proposal to purchase a class VI computer system to service both ERL in five locations and the Bureau of Standards at two locations is an alternative to two earlier proposals made independently by NBS and ERL several years ago. At that time the Congress requested a study of the two independent procurement requests by ERL and NBS, and GAO took a look at it and asserted that we could save—that is, the Department of Commerce could save—over $20 million by consolidating these procurements.

Senator GORTON. Do you agree with that?

Dr. LYONS. Yes, and indeed, the proposal that we have now made, that is, that the Department has made, does show a life cycle cost saving of over $20 million.

Senator GORTON. And will you keep the Univac?

Dr. LYONS. No, sir.

Senator GORTON. But will it have any value?

Dr. LYONS. The Univac was acquired by a sole source procurement as an interim replacement for two older machines at the Bureau, and the condition of such a sole source procurement was that it could not be declared an inherited asset in the new procurement, that is, it would provide unfair advantage to Univac in the procurement. So GSA has ruled that it may not be so declared.

Senator GORTON. Could the need for large-scale computing be met by buying time from existing supercomputer centers or Federal laboratories?

Dr. LYONS. Yes, sir, but it is much more expensive. It cost about $2,000 an hour to buy class VI computer time.

Senator GORTON. Two weeks ago at our National Science Foundation hearings we heard testimony about underutilization of supercomputers.

Is the size of NBS's workload along with ERL's, sufficient so that underutilization would not occur?

Dr. LYONS. It is our belief that the utilization—the machine will be sold out before its 6-year lifetime is reached. The use will go up, of course. We will start off with a somewhat less than full capacity. We should be at shifts in a year or a little more. So we think we have adequate load.

Senator GORTON. How is cost and allocation of time to be divided between NOAA and NBS?

Dr. LYONS. NOAA should have about 40 percent and NBS about 60 percent.

Senator GORTON. Is NOAA contributing a proportionate share of the cost of the computer?

Mr. KAMMER. They are not contributing a proportionate share. The total cost of acquisition is about $19.9 million, and that is derived by $8 million from funds available to NBS, about $3 million from funds available to NOAA, and then this appropriation request of $8.9 million.

Our reasoning was that both NOAA and NBS appear before the same committees for this purpose and the same appropriations process, and it would be easier to explain it in one place than two.

Senator GORTON. But it is the same number of dollars however?

Mr. KAMMER. Yes, sir.

Senator GORTON. Dr. Ambler, I want to thank you and those who are with you here today.

We will probably have some more questions which we will submit in writing.

We know both Senator Hollings and Senator Riegle have written questions which will be submitted to you and to which we would ask prompt written answers because, as you know, we should like to determine this authorization bill and pass it through the Senate as quickly as we can.

Mr. AMBLER. Thank you, sir.

[The statement follows:]

STATEMENT OF ERNEST AMBLER, DIRECTOR, NATIONAL BUREAU OF STANDARDS

Mr. Chairman and members of the subcommittee, I am pleased to appear before you today to request authorization of appropriations for the programs and activities of the National Bureau of Standards (NBS) in fiscal year 1985.

First I would like to introduce my colleagues. I am accompanied by my Deputy Director, Mr. Raymond G. Kammer; by Dr. Donald R. Johnson, Director of the National Measurement Laboratory (NML); Dr. John W. Lyons, Director of the National Engineering Laboratory (NEL); Mr. James H. Burrows, Director of the Institute for Computer Sciences and Technology (ICST); and by Dr. Darrell H. Reneker, Acting Director of the Center for Materials Science (CMS).

OVERVIEW AND PROJECTIONS FOR THE NATIONAL BUREAU OF STANDARDS

I would like to open my testimony this morning by reading to you a short passage written by the Committee that reported the Bill to establish the National Bureau of Standards. (Report No. 1452, 56th Congress, 1st. Session, May 14, 1900): "It is therefore the unanimous opinion of your committee that no more essential aid could be given to manufacturing, commerce, the makers of scientific apparatus, the scientific work of the government, of schools, colleges, and universities, than by establishment of the institution proposed in this bill."

This passage, written in the year 1900, has been so significant to NBS that it was chisled in the wall in the lobby of our Gaithersburg laboratory when it was completed in 1965. These words continue to be a constant reminder of the confidence bestowed upon our organization by those who created it. We strive to remain worthy of this confidence, especially now, when our country is responding to serious challenges to our industry and manufacturing. These challenges call for industry, universities, and government to pool their resources in research and development. NBS is well-positioned to take advantage of the strength that lies in joint activities.

NBS is actively involved in planning, organizing and executing research in problem areas of national significance. Many of our staff members interact with industry to identify areas in which technological barriers prevent prompt introduction of new and competitive technologies. When these barriers are related to a lack of measurement methods, reference data, or test methods, NBS takes the lead role in efforts to remove the barriers. In cooperation with industry, we assess the problem, define the necessary research and development, and work with all parties concerned toward solving the problem.

We see as measures of the success of these external interactions many scientists and engineers from outside organizations working cooperatively with NBS staff members, many at our site and most at their own expense. We have, for example: 123 industrial research associates; 325 visiting faculty and students; 43 postdoctoral research associates; and 34 intergovernmental personnel exchanges.

In addition to these person-to-person interactions, we provide each year many other ways for technology transfer, for example: 1,500 technical publications; 2,500 technical talks; 600 seminars; and 100 major conferences and workshops.

And we receive annually 6,500 visitors, and 47,000 public inquiries.

We provide a range of services each year, for example: 7,000 calibrations for 1,000 industrial laboratories; 40,000 units of standard reference materials; 5,000 queries answered for standards and certification information; 110 other Federal agencies served through work we provide; and 470 staff members in voluntary standards organizations.

Person to person contacts with our professional colleagues in other organizations are a way of life at NBS. This type of cooperative and collaborative effort, with industries and universities working together with a National Laboratory, is precisely the approach recommended by the White House Science Council on Federal Laboratories, chaired by David Packard.

I believe we do an excellent job cooperating in this way and, indeed, we have a mission that encourages and clearly states how we are to cooperate. But we must do more. Thus we are now encouraging an even greater use of our research facilities by outside institutions. Before I present our budget request I would like to describe two of these facilities and two program areas which illustrate our intensified effort for cooperative research.

AUTOMATED MANUFACTURING RESEARCH FACILITY

The Automated Manufacturing Research Facility (AMRF) at NBS is one example of a facility in which we are havily involved with cooperative research. The AMRF is a unique research test bed that we are using to develop the quality control techniques and the software interface standards needed for the fully automated factory of the future. NBS researchers at this facility have close ties with industry, universities, and other government groups. For example, eight companies have loaned or donated capital equipment. We have a dozen Research Associates from various companies. There are ten research contracts with universities and in executing these contracts several faculty and students are working at the AMRF. The U.S. Navy has made a major financial investment in the program. The program is truly a national collaboration on a major new technology.

RESEARCH REACTOR

The NBS research reactor is a major national facility for cooperative research in materials characterization. During the past year, we have had over 150 collaborators at our reactor from 15 industrial firms, 22 universities, and 18 Federal agencies. We are proposing in our 1985 budget to develop a prototype cold neutron source and instruments for cold neutron research on materials. A cold neutron source will provide intense beams of long wavelength neutrons that are able to measure the internal structure of advanced ceramics, new alloys, and improved catalysts. Because neutrons are very sensitive to hydrogen, the new facility will be especially useful in measuring polymers, polymer matrix composites, and large biomolecules. The NBS reactor is the only one is the United States that was specially designed to accommodate a large cold neutron source. This proposed cold neutron source is essential for advanced NBS research and will provide to industry a capability not otherwise available in this country.

INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

The Institute for Computer Sciences and Technology (ICST) illustrates another aspect of the way in which we work closely with U.S. industry to meet international challenges in high technology areas. There have been a number of changes taking place in the manner in which we are executing the programs of ICST. These changes are especially significant in my view because they have gradually brought about, over the last two years or so, a much more harmonious relationship between ICST and the rest of NBS. ICST has become a very strong, integral part of NBS, whether looked at from a mission standpoint or from the standpoint of technical execution. I see the national leadership that ICST is providing in the standards area as impressive. They have successfully mobilized the interest of user groups such as the Network Users Association and the Association of Data Communications Users. ICST has been particularly effective in gaining the support of users and manufacturers in the development of computer network standards. ICST is working with the International Organizations for Standardization (ISO) and the the American National Standards Institute (ANSI) to develop technical specifications for standards and to test implementations of standards.

I am also delighted with the increase in laboratory facilities that ICST has established to support these testing programs and to investigate areas of new technology. Some of ICST's laboratory efforts include the investigation of artificial intelligence systems to assist programmers in developing computer programs and the development of test methods and performance measures for computers and networks. The test methods are essential to assure the correct performance of the protocols in a variety of networks. One such test program involves COMSAT with whom ICST plans to test protocols using satellite links. We are also increasing the amount of basic research in ICST by providing $700,000 of Competence Funds in fiscal year 1984.

SCIENTIFIC TECHNICAL INFORMATION

Another example of steps we are taking to increase our cooperation with industry and universities involves Standard Reference Data. Computer science offers new, cost effective opportunities to provide more and better data, in a form that can be disseminated to computerized design and manufacturing programs. Mathematical models, based on experimental data, will be coupled to computer-based dissemination systems and then to the computer aided design and manufacturing (CAD/CAM) systems now used in industry. Later this month NBS will host a two-day workshop at which government, university, and industry participants will meet to discuss this new approach for providing evaluated data, suitably formatted for user systems of the future.

FISCAL YEAR 1985 BUDGET

In fiscal year 1984, the Congress appropriated $115,718,000 for NBS. In fiscal year 1985, NBS is requesting an appropriation of $126,062,000. This request includes cost of living increases and adjustments of $7,488,000, program increases totaling $17,874,000, and program decreases totaling $15,018,000.

Today I am pleased to be able to request substantial increases for some exciting new programs. We are asking for $1,500,000 to provide the basic knowledge and design criteria to develop a cold neutron research facility. We are requesting an increase of $8,874,000 for the purchase of the much needed Class VI Supercomputer to serve the computing needs of both NBS and NOAA/Environmental Research Laboratory. We are asking for $2,500,000 to develop high priority measurement methods and standards for Process and Quality Control and $3,000,000 to meet the measurement needs for the chemical industry in the area of biotechnology. There is also an increase of $2,000,000 to replace the antiquated telephone system at the Gaithersburg laboratory.

BUDGET INCREASES

I would like to tell you a bit more about each of the proposed increases.

The $1.5 million increase will be used to establish the cold neutron source I described earlier. At this facility experiments will be designed, supported, and carried out by industrial groups in collaboration with our own staff. This capability can be established at a fraction of the cost of other alternatives because of the special design of the NBS reactor.

The $8.9 million budget increase will permit us to award a contract in October 1984 for purchase of a Class VI supercomputer system to serve both NBS and the Environmental Research Laboratories of NOAA. The need for a new central supercomputer system to be located at NBS has been well established by a number of studies conducted over the past several years. Math modeling of complex systems is the wave of the future in science and technology. If NBS is to continue to be a world class research organization for the Federal Government, we must have first class computing capabilities comparable to those of leading science and technology organizations elsewhere in government and industry. Installation is planned to begin in Spring 1985 with an operational system available for use by September 1985.

The budget includes an increase of $2.5 million in the area of Process and Quality Control for high-technology industries. This program will focus on the development of new physical measurement and calibration services aimed specifically at high priority requirements identified in cooperation with the National Conference of Standard Laboratories. The increasing use of precision electronic instrumentation and test equipment pervades the high technology, defense and manufacturing industries. Better quality control and improved capability for adhering to more demanding specifications are desperately needed by these industries. Expanded measurement capability is also required in medical applications such as radiation therapy, as well as in many other areas such as vacuum and leak rate determinations. NBS can provide the technical leadership in all of these areas, but we need new resources to develop and maintain new services. An independent panel of industrial and government experts have reviewed our priorities, and endorsed our plans and approach.

The budget also includes an increase of $3 million in the area of biotechnology. The industrialization of biotechnology is entering a stage which requires a stronger scientific foundation, and, compared with other high-technology areas, a more diversified or multi-disciplinary effort. Many firms have already approached NBS for help in theoretical and experimental areas involving the measurement of biomolecules and the understanding of their chemical activity.

At the present time, U.S. industry has a commanding technical lead in biotechnology, and prospects for economic growth are promising. NBS has a well established expertise in the closely related and rapidly growing area of clinical chemistry. NBS, the University of Maryland, and the government of Montgomery County, Maryland, have recently announced a joint effort to establish a national Center for Advanced Research in Biotechnology. NBS will contribute by making our facilities accessible to the Center's researchers. With the proposed increase, NBS will build on our base of experience and we will provide information on mechanisms of enzyme catalysis, thermochemical data on biomolecules, new physical and chemical measurement methods and Standard Reference Materials. We will assist U.S. industry in optimizing biochemical processes, improving analytical techniques and quality control, and in selecting and designing better biocatalysts.

Finally, the budget calls for a $2 million increase that will permit us to replace the obsolete telephone system at the Gaithersburg site. Replacement parts and equipment for the current system are no longer manufactured. Repairs are made with reconditioned or shelf stock remnants. Needless to say, maintenance of the current system is becoming increasingly burdensome and costly. Furthermore, the current system does not support data communications even at the lowest transmission speeds. In addition, the new all-digital telephone system will be a very flexible complement to our NBS computer network.

BUDGET DECREASES

The budget calls for decreases of $3,174,000 in Building Research and $5,141,000 in Fire Research. These reductions will eliminate both of these centers. The budget also includes a reduction of $5,000,000 in the Institute for Computer Sciences and Technology. The Measurement Assurance Program (MAP) and the National Voluntary Laboratory Accreditation Program (NVLAP) are to be decreased by $1,703,000. The proposed program reductions are made in order to focus our resources in areas that do not overlap with responsibilities of the private sector or State and local governments. Fire safety and building performance are the responsibility of state and local governments. Thus, it is our belief that the cost of necessary research for these and similar activities should be borne by them.

In the case of computer standards development, we propose to concentrate our efforts on international activities and to rely on our voluntary standards processes for addressing domestic ADP standards needs.

With respect to MAP and NVLAP, the proposed reductions are in keeping with the view that when direct beneficiaries of services can be identified, they should bear the costs.

CENTER FOR MATERIALS SCIENCE

Before I conclude my testimony I would like to tell you that in January of this year I designated the Center for Materials Science a Major Operating Unit at NBS, equivalent in the organization to NML, NEL, and ICST. As you know, materials science is the subject of special attention in the Administration and Congress and materials work is increasingly managed separately in industry and universities. The Center is a leading materials science institution with a well deserved reputation for the high quality of its research output. For these reasons, I want the highest levels of Bureau management to be directly involved in the Center's programmatic decisions and priority setting. That Center is heavily involved with industrial collaborations including a $4 million program with the American Society for Metals for alloy phase diagrams, and has begun similar efforts in phase diagrams for ceramic and plastic materials. The proposed cold neutron research facility will be an integral part of the Center.

I look forward to working with this Subcommittee in the future. I will be pleased to answer any questions you may have.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR RIEGLE AND THE ANSWERS THERETO

Question 1. Does the National Bureau of Standards cold neutron source project provide any research opportunities in technologies that are important to maintaining U.S. international competitiveness in certain strategic industries?

Answer. Yes. Significant advances are possible in ceramics, polymers and polymer blends, advanced metal alloys, semiconductor materials and biomolecules. These advances will be of major importance to industries such as automobile manufacturing, aerospace, electronics, communications, metals processing and biotechnology. Materials research is at the heart of both traditional and emerging industries. Cold neutron beams provide a new and important frontier in this materials research. The U.S. is far behind Western European countries, which have invested more than $140 million in cold neutron facilities. In addition, Japan has launched a major research effort in this area.

Applications for intense cold neutron beams exist in virtually every branch of materials research. Opportunities range from studies of the detailed structrue of new materials, such as polymer blends, to the nondestructive assessment of processes which lead to in-service failure of metallic alloys.

Research opportunities include:

Investigation of key microstructrual and magnetic properties of new rapidly solidifed alloys which are being developed for many applications, such as advanced aircraft turbines, permanent magnets without critical materials for automobile starting motors and low loss materials for electrical power transformers. This research would impact the aerospace, automotive and electrical power industries.

Measurements of the growth of cracks and the nature of voids in new, high performance ceramics. The use of advanced ceramics in high temperature automobile engines, for example, can mean a 30 percent increase in efficiency. The primary impact of this research is in the automobile and electronic industries.

Study the distribution of "doping" elements and impurities in semiconductor materials at concentrations below one part in a million. This is a critical factor in improved process control for the semiconductor and communications industries.

Development of new catalytic materials for use in "cracking" crude oils. The shift in U.S. oil sources away from Middle Eastern oils to higher-sulfur oils has brought an urgent need for new catalysts. A cold neutron source will make it possible to observe the location and movement of chemical species in and on catalysts as reactions are taking place. The benefit is to the chemical and petroleum industries.

Measurement of the size and shape of "engineered" biomolecules in their natural environments as changes occur. Such a capability is of major importance to the emerging biotechnology industry.

Question 2. Have any industries expressed interest in having access to results of NBS cold neutron reserach or to the facilities provided as part of this project? Would NBS grant such access if there were interest?

Answer. Yes, a number of industries have expressed a strong interest in the use of these facilities. Since 1969, the NBS reactor has provided a source of conventional neutron beams for government, industry and academic research. More than 200 researchers from 48 institutions, including private companies, other government agencies, and universities, now are using the reactor in collaboration with NBS staff on research of mutual interest. Collaborators who have expressed a strong interest in pursuing cold neutron research include representatives from:

Allied Corporation
AT&T
Dupont
Eastman Kodak
Exxon
Ford
General Electric
Genex
Rockwell International
Union Carbide
Duke University
Mass. Inst. of Tech.
Penn. State University
Rutgers
University of California
University of Illinois
University of Michigan
University of Wisconsin
Department of Defense
National Inst. of Health

The NBS reactor is already being used by researchers from industry, academia, and other government agencies in collaboration with our staff on research of mutual interest. The $1,500,000 we are requesting in fiscal year 1985 will allow NBS to begin development of a full-scale source at our reactor for cold neutron research. The full-scale source is proposed as a multi-user, multi-purpose facility that would provide NBS, other Federal agencies, private companies and universities with an important research capability.

Question 3. Why should the cold neutron source project be funded at the NBS reactor rather than at some other source?

Answer. In my view, the NBS reactor offers the most neutron experimental facilities for the lowest cost. Because of the way the NBS reactor was built we can modify it at less cost than any other reactor in the U.S. to provide access for more simultaneous experiments.

The NBS reactor is especially well suited for the development of a cold neutron research facility, It is the only neutron source in the United States that is designed to accommodate a large volume cold moderator in its high intensity (core) region; the effectiveness and versatility of a cold neutron source for materials science research depends directly on its size. This will allow the NBS facility to provide cold neutron intensities unmatched by any other U.S. reactor. In addition, the nature of the NBS source design allows the flexibility to install up to five neutron guide tubes for transporting neutron beams to an external hall, thereby enabling a greater number of research instruments to utilize the cold neutron source. Installation of a cold source at NBS would not interrupt current research at the reactor. Although it would be possible to retrofit other existing reactors with a large volume cold neutron source, the cost would be greater than three times as much and would require reactor shut down for about three years. A completely new reactor would cost more than $200 million.

Finally, NBS has many years of experience in the sort of cooperative research ventures necessary to make such a facility a success. The mission of NBS as defined by Congress in the enabling legislation is the provision of measurement standards and services, test procedures, reliable data and research in support of the nation's efforts in science, technology and commerce. In fulfilling this mission NBS has a long history of cooperative arrangements with university and industrial communities and has many mechanisms in place for industrial research associates, guest workers, visiting university faculty and students, and post-doctoral research associateships.

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS THERETO

Question 1. Dr. Ambler, I note in your testimony the glowing tribute you pay to the Institute for Computer Sciences and Technology.

I quote: "I see the national leadership that ICST is providing in the standards area as impressive."

We all know that the use of computers is on the increase, as is the need for the Federal government to assist in our setting of standards. In view of this, I find it curious that the budget contains only $5 million for the Institute, a 50 percent decrease from FY 84. This is a sum that the prepared testimony of another witness says is too little and that ICST, if funded at that level, ought to be disbanded.

Could you comment on this?

Answer. NBS work in Federal automatic data processing (ADP) standards currently addresses management and use of computers, computer security and risk, government-wide ADP management, and international networking standards.

Nationally, ICST's posture is that of "consumer advocate", providing the technical assistance necessary to make the Federal government a "smart" buyer and user of ADP products and acting as a technology transfer agent to State and local governments and to both large and small businesses. Some examples of ICST's effectiveness include: successful negotiation of an agreement with half-a dozen major vendors who have agreed to provide the U.S. Navy with office equipment capable of the compatible interchange of documents; public support by the Network Users Association, a group of about 160 large ADP users, including General Motors, Westinghouse, Boeing, and most of the major banks and insurance companies in the United States; and extensive use by government and private industry of ICST's technology forecast (a GPO best seller) for ADP long-range planning.

Internationally, ICST protects U.S. vendors against foreign interest's attempts to develop international standards which can be used as non-tariff barriers that discriminate against U.S. manufacturers. ICST's effectiveness in the international arena is demonstrated by: successful efforts leading to the adoption of the American version of standards (or protocols) at layer 4 (transport) of the International Standards Organization's Open Reference Model; cooperative research projects with major communications and computer vendors including Comsat, IBM, and others; and an appointment of ICST as the point-of-contact for the distribution of all international ADP standards.

We have not questioned the effectiveness or quality of the work carried out by ICST. The fiscal year 1985 budget will confine NBS activities to the area of international networking standards, an area where American trade interests must be protected, relying on the voluntary standards process and other private sector mechanisms for the other computer-related standards.

Question 2. The United States leads the world in residential fire fatalities. The Center for Fire Research is the one national laboratory that examines the nature of fire and fire protection.

Are there state or local laboratories that could step in and take over this important work?

Has the private sector expressed an interest in doing fire research?

Answer. The Center for Fire Research has developed an outstanding reputation for carrying out technical activities that provide the scientific and technical basis to reduce the Nation's fire losses and the cost of fire protection. However, the fiscal year 1985 budget priorities for NBS were formulated with particular concern for areas where the Federal government may be undertaking efforts that are more properly the role of the private sector and State and local governments. Fire safety has always been the responsibility of State and local governments. Therefore the cost of necessary research for these activities should be borne by State and local governments.

There are several private sector organizations that do conduct some applied fire research. Notable among these are Factory Mutual Research Corporation, Underwriters Laboratories, and the Southwest Research Institute. All three of these organizations do commercial fire tests, and carry out fire research to a limited extent in areas of their commercial interests.

Question 3. Three years ago there was a terrible disaster at the Hyatt-Regency Hotel in Kansas City, Kansas. As I understand it, the Center for Building Technology played an important role in investigating the causes for this tragedy.

Could you relate to us details of the participation of CBT in that investigation? And, could you also comment on what state, local, or private sector groups would take over this function if CBT is disbanded?

Answer. Details of the participation of the NBS Center for Building Technology in the investigation of the Kansas City Hyatt Regency walkways collapse were detailed in an NBS report published in May 1982. A copy of that report,[1] NBS Building Science Series 143, "Investigation of the Kansas City Hyatt Regency Walkways Collapse," and its Executive Summary follow.

We know of no other organization currently capable of taking over this unique function. The American Society of Civil Engineers at Congressional hearings on February 22, 1983, acknowledged the CBT role as the neutral laboratory investigating major building and construction failures, identifying the technical causes and publishing the results to educate the public and the building industry, and stated that neither they nor other nonprofit organizations could replace the technical abilities and professional expertise of CBT at this time.

EXECUTIVE SUMMARY

"On July 17, 1981, two suspended walkways within the atrium area of the Hyatt Regency Hotel in Kansas City, Mo., collapsed leaving 113 people dead and 186 injured. In terms of loss of life and injuries, this was the most devastating structural collapse ever to take place in the United States.

"On July 20, 1981, Senator Thomas F. Eagleton's office contacted the National Bureau of Standards and requested that technical assistance be provided to Kansas City. Shortly thereafter Kansas City Mayor Richard L. Berkley asked NBS to determine the most probable cause of the walkways' collapse. Senators Thomas F. Eagleton and John C. Danforth and Congressman Richard Bolling endorsed the Mayor's request for the NBS to conduct an independent investigation. NBS researchers first arrived in Kansas City on July 21, 1981. During the course of the investigation, the NBS team of engineers and scientists inspected the Hyatt Regency atrium area and the warehouse where the walkway debris was stored.

"In the early phases of the investigation, NBS involvement was limited by court order to visual and photographic observations and measurements. NBS requested permission to weigh selected walkway spans and to remove for additional study and destructive examination certain portions of the walkway box beams, hanger rods, concrete decks, and nuts and washers. The Bureau's requests were eventually granted under court orders after agreement was reached with litigants involved in various legal actions stemming from the collapse of the walkways.

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[1] The report is in the committee files.

"Documents such as drawings, specifications, inspection reports, test reports, and construction logs, as well as photographs and videotapes became available to NBS from a number of sources. These were useful in gaining information about the walkways as originally approved for construction and as modified during the construction process.

"NBS conducted extensive laboratory tests on Bureau-fabricated mockups of parts of the walkways. Tests were also conducted by NBS on portions of the debris. Analytical models were developed to predict the response of the walkways to various loading conditions. Also, tests were conducted to determine material properties and weld and fracture characteristics.

"The Hyatt Regency consists of three main sections: a high-rise section, a 'function block,' and a connecting atrium area. As built, three suspended walkways spanned the atrium at the second, third, and fourth floor levels and connected the high-rise and function sections. The second floor walkway was suspended from the fourth floor walkway which was directly above it. In turn, this fourth floor walkway was suspended from the atrium roof framing by a set of six hanger rods. The third floor walkway was offset from the other two and was independently suspended from the roof framing by another set of hanger rods.

"In the collapse, the second and fourth floor walkways fell to the atrium floor, with the fourth floor walkway coming to rest on top of the lower walkway. Most of those killed or injured were either on the first floor level of the atrium or on the second floor walkway. The third floor walkway was not involved in the collapse.

"As originally approved for construction by the Kansas City Codes Administration Office, the plans for the walkways called for a single set of hanger rods (attached to the roof framing) which would pass through the fourth floor box beams and on through the second floor box beams. The box beams—made up of a pair of 8-inch steel channels with the flanges welded toe to toe—were to rest on hanger-rod washers and nuts below each set of beams. Under this arrangement each box beam would separately transfer its load directly into the hanger rods.

"However, during construction, shop drawings were prepared by the steel fabricator which called for the use of two sets of hanger rods rather than a single set. One set of hanger rods extended from the fourth floor box beams to the roof framing and another set extended from the second floor box beams to the fourth floor box beams. Under this arrangement all of the second floor walkway load was first transferred to the fourth floor box beams, where both that load and the fourth floor walkway load were transmitted through the box beam-hanger rod connections to the ceiling hanger rods. As indicated by their stamps, these shop drawings were reviewed by the contractor, structural engineer, and architect.

"Efforts were made to establish as accurately as possible the loads on the walkways at the time of the collapse. Weighing of selected walkways debris along with measurements taken on concrete cores removed from the walkway decks permitted NBS to determine that the actual walkway dead load (self-weight) was approximately 8 percent higher than the nominal dead load. (The nominal dead load is an estimate based solely on the project's contract drawings.) Estimates of the loads due to people present on the walkways at the time of collapse (live load) were much more difficult to make. Witnesses made a number of conflicting statements regarding the numbers and activities of people on the walkways just prior to the collapse. However, a television crew had videotaped parts of the walkways minutes before the collapse. By studying this videotape, NBS concluded that 63 people represented a credible estimate of combined second and fourth floor walkway occupancy at the time of collapse.

"Based on field, laboratory, and analytical investigations, NBS concluded that:

"(1) Collapse of the walkways occurred under the action of loads that were substantially less than the design loads specified by the Kansas City Building Code.

"(2) The ultimate capacity of box beam-hanger rod connections can be predicted on the basis of laboratory test results.

"(3) Under the action of the loads estimated to have been present on the walkways at the time of collapse, all fourth floor box beam-hanger rod connections were candidates for initiation of walkway collapse.

"(4) Observed distortions of structural components strongly suggest that failure of the walkway system initiated in the box beam-hanger rod connection at location 9UE (east end of middle box beam in fourth floor walkway).

"(5) As constructed, the box beam-hanger rod connections, the fourth floor to ceiling hanger rods, and the third floor walkway hanger rods did not satisfy the design provisions of the Kansas City Building Code.

"(6) The change in hanger rod arrangement from a continuous rod to interrupted rods essentially doubled the load to be transferred by the fourth floor box beam-hanger rod connections.

"(7) The box beam-hanger rod connection would not have satisfied the Kansas City Building Code under the original hanger rod detail (continuous rod).

"(8) Under the original hanger rod arrangement (continuous rod) the box beam-hanger rod connections as shown on the contract drawings would have had the capacity to resist the loads estimated to have been acting at the time of collapse.

"(9) Neither the quality of workmanship nor the materials used in the walkway system played a significant role in initiating the collapse."

Question 4. I note in the budget the recommendations that the Measurement Assurance Program and the National Voluntary Laboratory Accreditation Program be funded solely by the assessment of feeds to users of the services.

How does the Bureau plan on financing the research for new Measurement Assurance Programs (MAPs) or new Standard Reference Materials (SRMs)?

If the programs are based on reimbursable funding, wouldn't they become just "job shops"?

Answer. NBS is looking at two options for financing the research for new MAPs and new SRMs. One option would be to increase fees for customers of current services to attempt to obtain additional revenue to fund development of future services. NBS is testing the feasibility of using this approach and will report to the Congress on our findings in early May. In fiscal year 1983, NBS raised SRM user fees by an average of approximately 22 percent (relative to fiscal year 1982) in an attempt to raise an additional $500,000 to fund research on new SRMs. Because unit sales decreased by over 16 percent relative to fiscal year 1982 [33,108 (fiscal year 1983) vs. 39,523 fiscal year 1982], only an additional $163,000 was generated in fiscal year 1983 relative to fiscal year 1982. The drop in unit sales also caused problems in the financing of SRM production projects. The experiment indicates it may be difficult to raise sufficient research funds to develop new services through increased user fees for existing services.

The second option being pursued by NBS required the funding needed to develop new services to be obtained directly from the organizations that will ultimately benefit from the new service. This approach requires potential customers to provide "up front" funds two to three years before the service can be made available to them.

Another source of reimbursable funding for SRM and MAP R&D may be other Federal Agencies that have specific requirements related to their mission responsibilities. If such funding is obtained, NBS priorities would of course, be heavily influenced by the sponsoring organization.

Senator GORTON. The next witness is Mr. Les Huntley, John Fluke Manufacturing Co.

STATEMENT OF LES HUNTLEY, METROLOGY MANAGER, JOHN FLUKE MANUFACTURING CO., INC.

Mr. HUNTLEY. Thank you, Senator.

It is nice to meet you face to face.

Do I have 7 minute?

Senator GORTON. Yes, you do. I think you can get through your statement in that time.

Mr. HUNTLEY. I would like to just read this, if I may.

I am really pleased to be here as a representative of John Fluke Manufacturing Co., which is normally referred to as "Fluke," to present my views and those of my employer on the proposed budget of the National Bureau of Standards. I am metrology manager at Fluke, which means that I am the person responsible for the quality of measurements made in designing, producing and servicing Fluke products.

Fluke is headquartered in Everett, Wash., and is the world's third largest manufacturer of test and measurement instrumentation, with annual sales revenue of $200 million and employing some 2,700 people. Forty percent of Fluke's business revenues come from exports outside of the United States. This large percentage of export business is fairly typical of high-technology companies. The life blood of our company is the development of significant new products, which at Fluke means new measuring instruments. Our ability to produce state-of-the-art products is directly related to the accuracy and accessibility of the national standards. It is this which underlies our interest in and concern for the budget of the NBS, which is the agency charged with responsibility for maintaining the standards and making them accessible to U.S. industry.

Since its founding, the Bureau of Standards has been an asset upon which U.S industry has built. A decline in real funding for the NBS over the past 20 years has coincided with a decline in the technological edge which U.S. industry has enjoyed in the world marketplace. As a citizen of this country and as a professional who has made a life work of quality measurements, and as an employee of a high-technology manufacturing company, I confess to considerable personal distress at the erosion over the past several years of the budget and the effectiveness of this vital element of our economy.

Now, one of the most significant contributions over the past several years has been a new approach to making accessible the standards needed to insure the quality of U.S. manufactured goods. This approach, called a measurement assurance program, or MAP, provides U.S. manufacturers with ready access to the most accurate measurement standards available in the world. In high-technology industries, product quality is directly related to measurement quality. The NBS MAP's are directed at maintaining measurement quality. Failure to provide for the continuation and expansion of these programs will severely impact the ability of U.S. manufacturers to remain competitive in the world marketplace. As you know, the high-technology industries have contributed a healthy trade surplus, and this surplus can disappear rapidly if the Nation's scientific base of standards is allowed to erode or to be made inaccessible to U.S. high-technology industry.

Eliminating the development of all new MAP programs, as is proposed, will have long-term deleterious effects upon the competitive performance of U.S. manufactured products, and will reduce the operational readiness of our Armed Forces below the levels attainable with adequate, frequent, and accessible calibrations. This proposal to cut MAP funding comes just at the time when American industry is beginning serious efforts to adapt the MAP approach to control total measurement quality in the manufacture, service and use of measuring instrumentation, and it is an adaptation which has enormous potential for improving the productivity of U.S. industry, the quality of U.S. products, and the operational readiness of U.S. Armed Forces. Adaptations of the MAP approach such as the Fluke direct voltage maintenance program, cannot achieve their potential for impacting total quality without the active support and cooperation of the National Bureau of Standards.

Fluke requests that the total fiscal year 1985 base amount for MAP programs be restored in the current authorization and that a long-term commitment be made to supporting the NBS MAP programs, with special emphasis being placed upon cooperation with measurement assurance progams in U.S. industry.

There is an increasing tendency for foreign governments to require products to be qualified by an accredited laboratory before they can be introduced into the market in their countries. The lack of laboratory accreditation can be and is used as a nontariff barrier to trade. The recent international negotiations aimed at securing reciprocal acceptance of participating governments' laboratory accreditations are well conceived. Fluke supports the NBS laboratory accreditation program and would not willingly see it terminated or substantially decreased. The $500,000 in question which we understand to be essentially all that is budgeted for this program, is a small effort, given the large number of facilities which will potentially require accreditation. Fluke considers it appropriate for NBS to direct its accreditation efforts toward becoming an accreditor of accreditors, as was recently proposed by the American Association for Laboratory Accreditation.

Fluke also supports the authorization of $2.5 million for strengthening the science base for measurements and standards which is included in the process and quality control initiative. We consider it ironic that our economy expends hundreds of millions of man-hours counting and weighing and dimensioning the articles we trade, and counting the numbers of pennies given in exchange for them, but is often oblivious to the quality or the true nature, if you will, of the items traded. It is true that we spend huge amounts for testing, but often the testing is incomplete, inaccurate, or ineffective, and cannot be considered true measurement. In the case of complex, expensive, few of a kind devices, what is needed is a complete assessment of the fitness for use, the total quality of the device. Fluke emphasizes that NBS should expend these funds in ways which directly impact measurement technology and should leave basic research into physical phenomena to others who have a less direct impact upon industry.

Fred Hume, Fluke's vice president for technology and planning, has a favorite expression: "You can't make what you can't measure because you can't tell when you've got it made." Allow me to reword that to make it more appropriate for a purchaser:

You can't buy what you can't measure because you can't tell when you have bought the farm."

We at Fluke believe that it is time to recognize the contribution the National Bureau of Standards makes to the well-being if this country and then to act in ways which will encourage it to serve us with excellence, as it has for these many years.

Thank you, sir.

Senator GORTON. Thank you, Mr. Huntley.

I was intrigued by your remark that American industry is beginning serious efforts to adopt the MAP approach to control measurement quality and measuring instruments and your belief that that trend has enormous potential for American productivity.

Can you elaborate on that comment a little bit?

Mr. HUNTLEY. Yes, sir, we can.

The calibration system that is in place in this country now was conceived back in the 1950's and began to be implemented in the mid-1960's, which makes it over 20 years old, and the MAP approach is a distinctively new way of approaching the problem of assuring measurement quality.

Fluke is a leader in the field, one of the leaders in the field. There are other areas. I believe Eastman-Kodak is another corporation that is very heavily into MAP, and as I have said, the goal of MAP programs is to attain total measurement quality, control of total measurement quality, whereas a calibration program normally conceived strictly deals with single measurements. So I personally feel that the potential for MAP-related programs for making measurement technology—I am getting lost here.

The crying need is to be able to tell precisely what we are manufacturing and to be able to control that very closely. That is in the manufacturing industry. A purchaser such as the government needs to be able to know precisely what it is that they are purchasing, and an operation like the armed forces needs to know precisely what the status of their weapons systems are, for example. The MAP approach has the potential for giving them that kind of information. At least that is my personal opinion.

Senator GORTON. Thank you.

As you mentioned, the budget includes $2.5 million for strengthening the base for measurements and standards.

Can you elaborate on your position about how those funds should actually be spent?

Mr. HUNTLEY. Yes; it is a personal perception. I would not say it is a studied opinion, but it is a personal perception that the Bureau of Standards on the one hand expends much of their effort into supporting science in this country and appears to sometimes lose track of the fact that it is industry and commerce which derives much of the requirement for measurements in this country.

So I believe, or we feel at Fluke that the Bureau should recognize the difference between measurements which support science and which support technology, for example, and that they should expend these funds in ways that support the technology rather than science.

Does that answer your question?

Senator GORTON. Yes, it does.

Thank you for coming all the way across the country to help us in this manner. It may be that we will ask you some additional questions in writing, and Senator Hollings, who regrets that he could not be here today, will have some written questions for you.

Thank you very much.

Mr. HUNTLEY. Thank you.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR HOLLINGS AND THE ANSWERS THERETO

Question. Is there any recognized body (State or private sector) that conceivably could step in and take the place of the NBS MAP and NVLAP programs?

Answer. There are no recognized bodies in the public or private sector which could assume the place of the National Bureau of Standards maintaining existing Measurements Assurance Programs (MAP's) or establishing new MAP's or a National Voluntary Laboratory Accreditation Program (NVLAP).

The National Bureau of Standards has, over the past fifty years, gained international respect for its work in measurement standards. If another organization were given responsibility for MAP's or NVLAP it is unlikely that it would be able to achieve international respect for its program. This would have serious impact on U.S. manufacturers which export extensively and have relied on the acceptance of NBS approval by foreign purchasers and their governments.

Question. Could you give us an idea of how seriously this might hurt the industries that rely on MAP and NVLAP?

Answer. For U.S. industry to remain strong—for it to survive at all in the long run—it is absolutely essential that it be able to make measurements of sufficient quality to allow it to maximize its total productivity and to optimize the quality of its products. The existing Measurement Assurance Programs are the foundation of the system required for controlling total measurement quality in industry. Second or third generation MAP's will give industry the measurement tools it needs for producing quality products, and will give the sophisticated consumer, including the Armed Forces and other government agencies, the tools they need for purchasing quality products. It is highly unlikely that such sophisticated measurement concepts will be developed by metrologists scattered throughout industry. A strong central program is needed, and that program properly belongs in the National Bureau of Standards.

Senator **Gorton**. The third witness will be Mrs. Shirley Prutch, vice president and general manager of Martin Marietta Data Systems.

STATEMENT OF SHIRLEY F. PRUTCH, VICE PRESIDENT AND GENERAL MANAGER, MARTIN MARIETTA DATA SYSTEMS, AND CHAIRMAN, EVALUATION PANEL, INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY, NATIONAL BUREAU OF STANDARDS

Ms. **Prutch**. Thank you.

I would like to speak to you today for a few minutes about why I believe the ICST should not have their budget cut.

I have served on the panel for the past 3 years for the ICST and the Institute over that time has grown immensely, especially in their reputation throughout not only the United States, but the country, our country and the other countries over the world. Their expertise in bringing about standards, which I believe have a great deal to do with keeping the data processing industry alive and as well as keeping our products within this country the top notch throughout the world, has come through the ICST's ongoing efforts. They have been able to provide a synergy by having not only symposiums, they publish newsletters, they make themselves available through teleconferences, and by doing so, they bring people together from industry that otherwise would not talk.

I am a firm believer that the more we can take away from the Government and put in the public sector, the better off we will be, so I find myself in almost an embarrassing situation when I say I believe ICST needs to be there. Maybe I have grown up a bit over the years and found that there are somethings that industry as such will not do best. I believe this is one of them because in industry we all, within the various parts of industry, have a bottom line number that we are living up to for our shareholders, and that is not always the best way. We will put a hook or a crook in some connection for a piece of gear that will make us unique in our product, and that is something that in my mind is not the best, especially in the Federal Government.

You have a very large base for data processing, but it is not enough in itself to make private industry build just for the Federal Government.

One of the things that has happened that I think is a good example of this is word processing. The word processors around this country and around the world are not compatible, and yet ICST, when it was invited in by the Navy, brought together a group of manufacturers and came up with compatible interfaces so that you could have compatibility within an environment and not be locked into one single vendor nor have an incompatibility where word processors could not talk to each other. I think that's key to the ongoing of ICST.

I believe that the budget cut—and I have not gotten down deeply into the numbers, but it is inconceivable to me that a $5 million budget for ICST for fiscal year 1985—I cannot believe where time is going, Senator—I cannot believe they can do the job, and I also believe that with the state of the economy and the deficit, we would be better off not taking any of that money and saying ICST folds its tent. This is a personal opinion. It is not a panel opinion, and certainly I am not speaking for the Bureau nor the Academy of Science. This is Shirley Prutch's comment, but I believe there are times when we are better off not taking any of the money than taking part of money and saying, well, we will do what we can.

In this arena I believe we need to do an outstanding job, and I do not believe $5 million is going to hack it.

Senator GORTON. Thank you very much.

And we will include your written presentation in the record in full.

Referring to that written summary, I was interested in your suggestion that ICST's mandate be broadened to cover work with industry ADP users.

Do you have specific suggestions on how to accomplish this, and can you tell us the specific or potential benefits which it would have?

Ms. PRUTCH. One of the areas I believe that could happen is by congressional mandate that says ICST is alive and well. That in itself and a statement from the group that the ICST was part of the National Bureau of Standards and had as its mandate the standards arena for the Federal Government, that in itself would help broaden its mandate in terms of making it a viable source.

They, the ICST people that then attend the standards arena and the groups that do the voluntary standards, would have a place of their own in the Sun, they would have the mandate that says wait a minute, this is not just a set of standards for the Federal Government, but we are being looked at as standards for the industry for the United States. That is one of the areas, I believe, and I believe that would give us credibility throughout the world when the people on their own merits go abroad to talk standards, international standards.

Senator GORTON. You told us both orally and in your written statement that the proposed request for ICST is so inadequate that we would be better off disbanding it than simply accepting that.

I take it that that means that you do not believe that $5 million would be adequate if ICST's activities were confined to international standards.

Ms. PRUTCH. I believe that being confined to international standards is a tip of an iceberg, and that in order to do that they are going to have to have the backing of what they do throughout the United States in the symposiums, they are going to have to have the technical expertise so that when their participants participate in the meetings, that they are looked upon as experts, and I do not believe that that expertise can be held with a $5 million budget.

Senator GORTON. At $15 million, your level of recommendation, would you expect ICST simply to be able to continue its current activities or to expand into new areas?

Ms. PRUTCH. I think they could expand their activities because in my mind they are on a roll right now, and I believe that they could state what it is they are going to accomplish and be measured by it. And that is one of the things that the evaluation panel will be asking them to do over the next 3 years.

Senator GORTON. Thank you, Ms. Prutch.

We may have additional written questions, and as was the case with the previous witness, Senator Hollings, who regrets that he could not be here, does have some written questions the answers to which we would appreciate.

Ms. PRUTCH. Fine, thank you.

[The statement follows:]

STATEMENT OF SHIRLEY F. PRUTCH, CHAIRMAN, EVALUATION PANEL, INSTITUTE FOR COMPUTER SCIENCE AND TECHNOLOGY, NATIONAL BUREAU OF STANDARDS

Mr. Chairman and members of the subcommittee; I am Shirley Prutch, Vice President, Martin Marietta Data Systems. I have served on the ICST Evaluation Panel for the last three years and now chair the Panel. Thank you for inviting me to talk with you today. To make sure that we are dealing with in the same framework, I would first like to review ICST's legislative mandate and tell you what I believe to be its implications. ICST's primary charter comes from the "Brooks Act" which directs the Department of Commerce to develop standards and guidelines which lead to "the economic and efficient purchase, lease, maintenance, operation and utilization of automatic data processing equipment" within the Federal Government (PL 89-306) and to conduct whatever research is necessary to meet that goal.

The Panel has found that ICST must engage in a broad range of activities in order to fulfill this mandate since most organizations could write standards and guidelines, for that is relatively easy to do. One problem, however, comes when those standards and guideline are translated into real equipment to be used by ordinary people under normal work conditions. Proper research is required in consultation with the manufacturing industry if industry is to build to the standard. Similarly, if staffs have not been given appropriate guidance, very few agencies will be able to use the equipment "economically and efficiently" ICST, therefore, spends a great deal of time working with the vendors and the agency users and, the Evaluation Panel believes, does so with very good effect.

Problem two comes when you convert from equipment which has been custom-built to the specifications of one particular user (in this case the Federal Government) to equipment which can be bought off-the-shelf by all users. It is only when you get to an "off-the-shelf" position that real economies can be realized. The Federal Government, even with its enormous resources, cannot bring that position about by itself. The Federal Government buys about 6 percent of the ADP (automatic data processing) equipment sold in the United States and even though that represents a huge federal investment it is not a sufficient market to cause standardization. In order to do that, ICST must aggregate a market of State and local governments and industry ADP users. Therefore, the Institute works with many of the large users in order to educate them and to ascertain their needs. ICST then brings those needs to the national and international voluntary standards committees where, to a large extent, the vendors are the dominant players.

As the unbiased leader of an unofficial coalition of users, ICST is able to demonstrate that a worthwhile market exists, and as a premier research agency, ICST is able to lead the voluntary organizations toward technically sound standards that result in off-the-shelf products—to the benefit of all of us.

This method of working has a number of important side effects—all of them good. In the international arena, ICST has been instrumental in preventing foreign competition from using standardization as non-tariff trade barriers. By ensuring that technical specifications do not discriminate against U.S. vendors, the Institute has effectively protected our trade interests. More importantly, ICST's standardization work has also laid the groundwork for significant innovation by the computer and telecommunications industry. Perhaps it is appropriate to spend a few moments discussing the relationship between standardization and innovation.

Thinking through and in discussion with various colleagues about this subject, I became informed of a draft of a contractor's report which had been prepared for the Office of Technology Assessment. According to my colleague, the report distinguishes between product standardization and system standardization as well as between proprietary information and nonproprietary information. (This is an important point in the discussion of ICST's role within the standardization world, because some people have suggested that the private sector can do the job.) A product is generally standardized through market-place usage; a number of different products are marketed and users gradually converage on the ones whose properties are most useful. This happens over a long period and official standardization takes place late in the process—usually after a de facto standard exists, i.e., the product which meets most users' needs is the product around which convergence happens. A system, however, requires standardization much earlier because basic connections must be in place before system innovation can be explored; meaning that the market testing, which precedes the standardization of a product, generally does not take place when the issue is a system. This is where ICST's testing laboratories assume an important role. The proposed standard interfaces for computer/communications systems are tested in the laboratories to make sure that they "work." In cooperation with individual firms, proprietary systems are tested to make sure that they "work" with the interfaces. With that assurance, industry can go about its process of system innovation with confidence.

The industry relies on ICST to provide a "neutral" ground for the testing of these interface standards because such standards deal with nonproprietary matters. Certain information and research results are proprietary to the companies which develop them. Other things, standards among them, are shared by an entire industry. Individual companies put most of their R&D resources into those things which are proprietary because that is where they get the greatest return on their individual investments. There are very few mechanisms available for cooperative participation in the research and development of nonproprietary material—partly because of our anti-trust laws and partly because the companies, in fear of jeopardizing their cimpetitive positions, will not divulge to one another the proprietary information needed to develop standards which must be used by all. ICST provides a trusted mechanism, as well as the synergy, for building the nonproprietary knowledge base which is essential to proprietary innovation.

Having presented what I have been told is the basis of the report prepared for the Office of Technology Assessment, you might choose to read that report. I look forward, naturally, to being able to do so as well.

Let me return now to ICST's method of working. I referred earlier to its usual method of working through the voluntary standards committees. Occasionally, though, the voluntary process is simply too slow to satisfy the immediate needs of the Federal agencies. In those cases, ICST tries to develop a "quick fix" that will be consistent with the direction of the voluntary committees but will, at the same time, solve the worst of the agencies' problems.

An example in point is one which the Panel applauded in last year's review of ICST's activities. That is the work that ICST did with the U.S. Navy in developing document interchange specifications. We all know of horror stories about trying to use the product of one word processor with a word processor of a different make. (As an aside, I relied on an electronic office automation system in preparing this testimony rather than assuming I could find compatible word processing equipment in the various cities I was in while preparing this statement.) If we can manage the interchange at all, we are apt to get a fifteen page paragraph with very funny looking margins. ICST worked with the Navy and a number of different vendors in developing some specifications that would solve many of the problems in effecting the interchange and the vendors have agreed to build to those specifications. This means that when the Navy procures its word processors in the future, it will not have to make a choice between being "locked into" a single vendor or putting up with the incompatibilities among products. This will save the Navy millions of dollars. Those savings will be magnified, of course, as other government agencies adopt the specifications; and the savings would be astronomic if U.S. industry should adopt the specifications.

That brings me to my request to this Subcommittee. Please broaden ICST's mandate to specifically cover work with industry ADP users. As I mentioned before, ICST works with industry as a by-product of its mandate to help Federal agencies.

For all its efforts, though, ICST cannot reach much of the consumer industry and we need ICST's leadership if we are to attain the level of productivity that the new computer and communications technologies make possible.

An area of improvement that the Evaluation Panel three years ago urged upon ICST was to tell their message, i.e., what they were doing, to the non-Federal Government world. The Panel was impressed with the work going on in ICST in many areas and felt that it was important that this non-biased group publicize their message to not only State and local government but to the consumer industry as well. ICST heard that recommendation and again was applauded by the Panel for their efforts in making their work better known. They have published news bulletins, sponsored forums as well as teleconferences and have generally been more vocal in what they were doing. This "tooting of their own horn," so to speak, was a very important aspect of making their non-biased synergy work. The panel feels very strongly in this area because ICST can provide a leadership which cannot come from industry itself.

For one thing, we are too diverse to produce a common leader. For another, many are not in the ADP business and as consumers, would not have the technical expertise required for genuine leadership. And for a third, we operate under the same non-disclosure restrictions as does the computer industry. As sometimes competitors, the possibility of sharing proprietary data is non-existent. But we can and do trust ICST. A broadening of ICST's mandate would allow them to treat user-industry relations as more than a by-product of their primary mission. Any increase in the productivity of American industry as a whole will not only strengthen America's trade position but will greatly benefit the American consumer.

There is one more matter which we need to cover—namely, ICST's budget. I have noticed that in the past, this Subcommittee has asked witnesses to comment on the Institute's funding. I would like to stress that I am not as conversant with the details of this budget as I would be if I were fighting for the budget of my areas within my corporation, but I would like to make two points. The first is that with the proposed five million dollar budget, ICST simply fulfill its current mandate.

If five million is all that is available, we would do better to disband ICST and thereby publicly state that the mandate is not needed rather than waste five million dollars with results that cannot be even close to acceptable. Having said that, I would expect a question from you asking what I believe might be an appropriate budget and again I would tell you I am not close to the details so I would hedge my answer by saying that as of five years ago, ICST's budget, in today's dollars, would be about fifteen million. Five years ago, it appears that that authorized funding allowed ICST to operate effectively. ICST today is much stronger because of their reputation than they were five years ago so I feel strongly that we, as taxpayers, as well as consumers, would get more bang for our bucks. Therefore, a roundabout answer to an unasked, at this point, question is that I respectfully suggest that you consider a fifteen million dollar level as appropriate for ICST's needs. With this level of funding, ICST can be held accountable for producing results that can be measured and will add to the productivity level of our government and our industries.

Thank you. I would be happy to answer any questions you might have.

[The following information was subsequently received for the record:]

April 3, 1984.

Hon. Ernest F. Hollings,
U.S. Senate,
Committee on Commerce, Science, and Transportation,
Washington, D.C.

My Dear Senator Hollings: Thank you very much for your continuing interest in ICST. As Vice President of Martin Marietta Data Systems, an information services company, my perspective and knowledge are that of a major user of computers rather than that of a manufacturer. My answer, therefore, to your first question cannot be as specific, in terms of actual dollar values, as would that of a member of the computer industry itself. However, most of us associated with the computer industry understand that without ICST's leadership in international standards development, the United States would probably lose its current lead, resulting in serious adverse impact on our trade balance.

International computer and communications standards determine the architectures of the computer systems that can be sold in the countries that adhere to them. Standards that require architectures which deviate significantly from those in common use obviously discriminate against countries, such as the United States, which have a relatively mature industry. Over the last two or three years, it was only the leadership of ICST that prevented the development of a major threat to our industry.

The international standards in question are communications protocols that specify the manner in which computers talk to computers through networks. They are being developed hierarchically, in layers. At the bottom layers, actual physical links are specified. ICST is currently having its greatest impact at the middle layers which specify the rules for transporting and receiving "bits" so that they can be understood at both ends of the transaction (the "transport" and "session" protocols). Within the next few years, the international standards groups will concentrate more closely on the upper layers ("presentation" and "application" which deal with such subjects as data management, graphics, and programming languages. Our computer industry has a huge economic stake at every level. Gains made at the lower levels can be lost as standardization proceeds through the hierarchy.

As a private citizen in the public sector, I am concerned as to the impact, both mentally and physically, that this annual budget issue brings the ICST staff. They need to know if they are part of a viable program and if their actions have a chance of "making a difference" in the future. People are indeed the lifeblood of ICST. The standards issue is influenced by people—their reputations due to their technical expertise. This, Senator Hollings, is what will suffer if ICST does not receive a constant commitment to meet their mandate. International standards, however, cannot be influenced in a vacuum. For these people to operate in the international arena, the ground work must have been accomplished "back home." Our people must have accepted credentials from their peers here in the United States and their research must stand on its own merits. This is why, in my opinion, it is impossible to ask ICST to "only" do the international standards.

In response to your second question, it is necessary to discuss the realtionship of ICST to three distinct segments of "industry," i.e., the large users, the peripheral manufacturers, and the large mainframe manufacturers.

The user industries, with which I am associated, look to ICST for guidance and leadership. Over 150 of us belong to the Network Users Association which has passed resolutions supporting ICST's program. Much of the work that ICST does for the government—such as the Navy office equipment work to which I referred in my testimony—is equally helpful to industry. Those of us who know about it, use it. A special subset of the using industry, the banking and insurance people, have particularly close ties to ICST because of their mutual interest in computer security matters. ICST is regarded as the premier civilian authority in this area and I believe that a representative of one of the large Eastern banks testified on ICST's behalf to the House subcommittee last year.

ICST's relationship to the peripheral manufacturers has always been cordial. Last year, the director of their trade association, CCIA, testified on ICST's behalf to your subcommittee. The reason for their support of ICST is clear: without standardization, the mainframe industry could (and probably would) make it technically impossible for peripheral vendors to connect their equipment to the larger machines. Incidentally, this would "lock in" all of us to the entire product line of our mainframe vendor.

ICST's relationship to the mainframe vendors has evolved over the last two years. Previously, the relationship was less than friendly at the corporate level for the reason mentioned above. More recently, because of the growing importance of the international standards, relations have grown considerably warmer. ICST traditionally has had mutually cordial relations at the techical level and that has migrated to the executive suites as the industry has come to recognize ICST's role in protecting the international position. Evidence of the turn-around is ICST's cooperative program in which over 150 vendors (include IBM) have expressed interest in testing the international protocols in ICST's labs, in the joint project among ADAPSO (the major industry trade association), the International Trade Administration, and ICST, and the joint display of local area network technology that ICST plans with 12 vendors for the NCC trade show in July. That show, usually attended by more than 100,000 people, is the industry's major annual event. Domestically, ICST has been working as an intermediary between the major users and the vendors to ensure that the user requirements are incorporated in off-the-shelf products (as in the Navy project). However, ICST will not (and should not) abandon its position as user representative and some arguments remain. For the most part, these domestic arguments are now regarded as family quarrels and the industry is generally supportive.

In the fiscal year 1983 Annual Report for ICST, the activities and organization outlined therein, some which I mentioned above, showed the magnitude of the effect that the ICST has had not only internal to the United States but external as well. As I stated previously in testimony, the Evaluation Panel three years ago urged ICST to "toot their own horn." The Panel urged this in order to make ICST a known force throughout the United States. ICST has done this and done it very well. ICST is known throughout the United States and industry comes to ICST for non-biased opinions and allows the ICST to be the coalescing force.

Senator Hollings, I hope that this in some way answers your questions. I naturally would be more than happy to discuss any of these issues further.

Sincerely,

SHIRLEY F. PRUTCH.

Senator GORTON. Our final witness is Mr. Richard Wolfe, president of the National Conference of States on Building Codes and Standards.

STATEMENT OF RICHARD E. WOLFE, PRESIDENT, NATIONAL CONFERENCE OF STATES ON BUILDING CODES AND STANDARDS, ACCOMPANIED BY ROBERT WIBLE, EXECUTIVE DIRECTOR

Mr. WOLFE. Good morning, Senator.

Senator GORTON. Good morning.

Mr. WOLFE. I would like to introduce to you the executive director of our conference, Robert Wible.

Senator GORTON. We are delighted to see him.

Your testimony is a fairly—no, I guess it is not. Much of this is in addition, but if you will limit your testimony to 5 or 7 minutes, we will include everything in the record as if read in full.

Mr. WOLFE. Thank you, Senator.

I wish to thank you and your subcommittee for inviting me to testify before you today on behalf of the States on the issue of future funding for the National Bureau of Standards Centers for Building Technology and Fire Research.

The organization which I represent, the National Conference of States on Building Codes and Standards, was founded in 1967 to nationally coordinate the building code and public safety interests of our Nation's 50 States and several territories. The voting membership of my organization is comprised of one Governor-appointed delegate from each of the States and three U.S. territories. These delegates, for the most part, at the statewide level have the broadest responsibilities for health and life safety in new and existing buildings.

In late January the conference learned that as in fiscal year 1984, the 1985 budget proposal would terminate funding for the Center for Building Technology and the Center for Fire Research at NBS. As we understand it, one of the major rationales offered for this action is that research performed by these two centers could and should be conducted by State and local governments and the private sector.

The States are gravely concerned over this matter. We believe that testimony before both Houses of Congress last year clearly showed the invalidity of this position. Nevertheless, once again we are being asked to provide justification for the funding of these two vital programs.

To prepare my testimony before you today, in early February our staff surveyed all of our State delegate members to gather data on each State's past, present, and future research efforts in the area of building technology and fire safety. As of last Wednesday, 30 of our 50 States had responded to that survey. The results clearly illustrate the need for continued funding for the Centers for Building Technology and Fire Research.

Attached to our written testimony which has been submitted is a sheet summarizing the States' responses, but I would like to briefly highlight the major points in their reply.

At present, only one State, that being New York, in toxicity, out of the 30 respondents, is conducting any research in the building technology and fire safety areas. The 29 of the 30 States not conducting such research uniformly noted that their State budgets are too small to even begin contemplating conducting building and fire safety research. Most of our States strongly stated that such research clearly belonged at the Federal level.

When describing their current research needs in the building technology and fire safety areas, 30 responding States repeatedly identified those research areas in which the National Bureau of Standards is currently engaged, that being structural failures, computerization of codes, indoor air quality, toxicity, flammability of building materials, smoke control and residential sprinklers.

When asked if their States could independently fund such research in the future if there were not a Center for Building Technology or a Center for Fire Research, all 30 States responded in the negative.

Finally, we asked each of our delegates if they had any comments on the proposed zero funding of the Bureau centers which they would like us to share with you today.

I would like to close my testimony by reading you several of these States' responses.

From the State of Iowa, "Of all the monies spent on research in other fields, the benefits derived cannot be any greater per dollar than that spent in the National Bureau of Standards."

From Rhode Island, "A loss of either of these two centers would leave a vacuum which could not be filled by either the States or private industry. The need for a national, objective, professional research agency is paramount in the protection of the public safety. Such as nonprofit oriented agency exists in the two agencies in question."

From the State of Illinois, "The need for the type of research that both of these centers provide should be obvious. Unnecessary loss of life will continue to occur if research is not performed. The duplication of the same research by 50 States would be sinful."

Senator, on behalf of our conference, its members and the States we represent, I respectfully request that your subcommittee take the necessary steps to restore the budget for both the Center for Building Technology and the Center for Fire Research. These centers must be allowed to continue their valuable research, research that enhances the health and life safety of the citizens of our States and territories.

I thank you, sir.

Senator **Gorton**. Mr. Wolfe, that's a magnificent set of testimonials. I wish we here in Congress could get testimonials like that every now and then.

This is something of a follow-up. Can you tell me how the States make use of the research which NBS performs in fire and building technologies, whether or not the results of that research are being sufficiently transferred by NBS to the States, and the degree to which States participate in the research by sending personnel here to the Bureau?

Mr. **Wolfe**. Senator, indeed we have a very close working relationship (with NBS). It has even been memorialized in an agreement of cooperation with the Bureau. Their personnel regularly attend our meetings in which our State delegates get together on an annual basis, and we in turn do visit the Bureau. We have a working relationship between our two staffs.

I might point out that all of our States have some degree of building regulation. Twenty-eight of our States have a statewide building code. So the work that comes out of the Bureau of Standards is certainly implemented at the State level.

Senator **Gorton**. OK. I thank you.

Last year, as you know, we did restore these programs, and this Senator at least has not seen any reason to change his mind from last year.

We may have a few additional questions, written questions for you, and as was the case with all of the other witnesses, Senator Hollings, who could not be here today, does have written questions, the responses to which we would appreciate as promptly as possible.

Thank you both for coming.

Mr. **Wolfe**. Thank you so much, Senator.

[The statement follows:]

STATEMENT OF RICHARD E. WOLFE, PRESIDENT, NATIONAL CONFERENCE OF STATES ON BUILDING CODES AND STANDARDS, INC.

On behalf of the Board of Directors and members of the National Conference of States on Building Codes and Standards, Inc. (NCSBCS), I want to thank Senator Gorton and the members of this Subcommittee for extending the Conference an invitation to testify before you today on the issue of future funding for the National Bureau of Standards' Centers for Building Technology and Fire Research.

The National Conference of States on Building Codes and Standards, Inc. is an organization founded in 1967 to nationally coordinate the building code and public safety interests of our nation's fifty states and several territories. The voting membership of the Conference is comprised of one governor-appointed delegate from each of the states and three U.S. territories. These delegates, for the most part, at the statewide level have the broadest responsibilities for health and life safety in new and existing buildings.

In late January, the Conference learned that as in fiscal year 1984, the fiscal year 1985 budget proposal would terminate funding for the Center for Building Technology and Center for Fire Research of the National Bureau of Standards (NBS). As we understand it, the rationale offered is that research performed by these two Centers should be conducted by state and local governments and the private sector. The Conference is gravely concerned over this matter. We believe that testimony before both houses of Congress during the fiscal year 1984 hearings clearly showed the invalidity of this position. Nevertheless, once again, we are being asked to provide justification for the funding of these two vital programs. To prepare our testimony before you today, I requested our NCSBCS staff in early February to develop and mail a questionnaire to all of our state delegate members to ascertain past, present and future research projects in the building technology and fire safety areas. As of February 29th, thirty of our fifty states responded to that survey. A sample of the survey questionnaire and a sheet summarizing the states' responses is attached to our written testimony.

At present only one state (New York on toxicity) out of our thirty respondents is conducting any research in the building technology and fire safety areas. The twenty-nine of the thirty states not conducting such research uniformly noted that their state budgets were too small to even begin comtemplating conducting building and fire safety research and indicated that such research clearly belonged at the Federal level.

Over the past five years only one other state responding to our survey (California) in addition to New York, has conducted research in these areas. In both cases (New York and California), these research projects have been undertaken under emergency conditions and were funded directly by the state legislature and not through the states' regular bugetary processes.

When describing their current research needs in the building technology and fire safety areas, thirty responding states repeatedly identified those research areas in which the National Bureau of Standards is currently engaged: structural failures, computerization of codes, indoor air quality, toxicity, flamability of building materials, smoke control and residential sprinklers.

When asked if their states could independently fund such research in the future if there were not a Center for Building Technology or a Center for Fire Research, all thirty states answered no.

Our survey results show that the centralization of such research at the Federal level is clearly in the national interest, and well within the scope of President Reagan's "New Federalism." Were it otherwise, we would have a chaotic and unproductive research system in which each state that could find resources for such testing and research, as their survey responses note, would duplicate research being done in another state or states. This would clearly be a waste of taxpayers' dollars.

As reported in our survey, state and local goverments neither have the research facilities nor the funding resources to conduct the building-related research now carried out by these two Centers. NBS has unique facilities and a staff of researchers with worldwide reputations for their expertise. These resources will not, could not, and should not be duplicated by individual states or the private sector.

From the inception of NCSBCS, in 1967, there has been a close working relationship with the National Bureau of Standards. In 1978, a Memorandum of Understanding was signed by NCSBCS and NBS. This Memorandum calls for NBS to provide technical assistance to NCSBCS and to conduct research needed by the States in carrying out building regulatory responsibilities. A copy of this Memorandum is enclosed for your information.

The use of NBS' research results by NCSBCS and the states, furthermore, has contributed effectively to the National Bureau of Standards' goal of transferring research results and up-to-date technology to the states, and ultimately, for the benefit of building owners and users.

Many technical studies and much research have been carried out in the Center for Building Technology and the Center for Fire Research as a direct result of needs stated by NCSBCS. In 1973, NCSBCS requested the Center for Building Technology to prepare criteria for energy conservation in new buildings in 1974, which were then used by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) as the technical basis for preparation of the ASHRAE Standard 90, "Energy Conservation in New Buildings." This Standard is now used as the basis for the regulation of energy use in new buildings for 48 states. We strongly believe that this is an example of Federal, state, and private sector cooperation at its finest. For the good of the nation, we must not eliminate a vital participant in these cooperative efforts.

In a more recent example of this relationship, slightly over a year ago, NCSBCS concluded a survey of its delegates to determine the need for additional research in the areas of structural integrity and fire safety in buildings. The results of this survey identified 17 areas of needed research. A request was forwarded to the Center for Building Technology and the Center for Fire Research to undertake the state-needed research relating to structural integrity and fire safety in new building construction. Research is now underway in the Center for Building Technology and the Center for Fire Research in response to this NCSBCS request.

In closing, I would like to reiterate the point which our states have made in their recent correspondence to us, that there is no organization presently in the states or in the private sector that could fill the vacuum should the Center for Building Technology and the Center for Fire Research of NBS be eliminated. As our delegate from the State of Illinois put it "the need for the type of research that both of these Centers provide should be obvious. Unnecessary loss of life will continue to occur if research is not performed. The duplication of the same research by 50 states would be sinful."

On behalf of NCSBCS, its officers and delegates, I respectfully request that your Subcommittee take the necessary steps to restore the budget for both the Center for Building Technology and the Center for Fire Research so that they may continue their most valued research; research that enhances the health and life safety of the citizens of all of our states and territories. Thank you.

Attachments.

SUMMARY OF RESPONSES TO NCSBCS MEMBERSHIP SURVEY—SURVEY OF STATE RESOURCES FOR BUILDING TECHNOLOGY AND FIRE SAFETY RESEARCH

PLEASE COMPLETE AND RETURN TO NCSBCS BY THURSDAY, FEBRUARY 23, 1984

1. Does your current state budget provide for research in: (Please circle one) (If yes, fill-in approximate amount).

(a) Building Technology—Yes. No. (30) Budget Amount $——.

(b) Fire Safety—N.Y.—(1) Yes. No. (29) Budget Amount $——.

2. If no, why does the current budget not provide for research in:

(a) Building Technology: State does not have adequate funding to undertake such research—16. This is not a proper function of state government & it belongs at Federal level in NBS—14.

(b) Fire Safety: State does not have adequate funding to undertake such research—16. This is not a proper function for states and it belongs at federal level in NBS—14.

3. Have past state budgets provided for research in:

(a) Building Technology—(29) No. Yes (1) (indoor air quality California in mobile homes) Budget Amount $——.

(b) Fire Safety—(29) No. Yes (1) New York—Toxicity Budget Amount $——.

4. If no, why did past state budgets not provide for research in:

(a) Building Technology: State did not have adequate funds for such research—21. This function belongs at Federal level—9.

(b) Fire Safety: State did not have adequate funds for such research—21. This function belongs at Federal level—9.

5. What major topics are or have been the subject of present and past research efforts?

(a) Building Technology None—27. Indoor air quality—1. Energy conservation in buildings—2.

(b) Fire Safety—None—29. Toxicity—1.

6. If your state is currently conducting research in these areas, in what additional areas of building technology and fire safety is more research needed for which you do not have sufficient funds for your state to undertake?

(a) Building Technology: N/A—29.

(b) Fire Safety: N/A—29. Toxicity—1. Flamability of room contents—1.

7. If your state does not conduct any research in either or both of these areas, what are your major research needs (e.g. toxicity, structural analysis, etc.) in:

Structural testing/investigation of structural failures—22.

(a) Building Technology: Computerization of code processes—6. Accessibility provisions—5. Seismic Safety—3. Indoor air quality—10. Energy Conservation—3.

(b) Fire Safety: Toxicity—27. Residential sprinklers and smoke detectors—10. Flammability of building contents—8.

8. Attached is a list of some of the more recent research projects conducted by the National Bureau of Standards Center for Building Technology and Center for Fire Research. If either or both of these Centers ceased to operate, which of these research projects would your state independently be able to fund and conduct?

(Please list): None—30. Fast acting sprinkler head system (maybe)—1.

9. Do you have any comments you wish to share on the prospect of the nonfunding of the Centers for Building Technology or Fire Research?

See attached sheet for comments from state of Illinois, Indiana, Oregon, Iowa, and Rhode Island.

List of States that responded to NCSBCS Survey as of February 29, 1984: Alabama, Arizona, California, Colorado, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Missouri, Montana, Nebraska, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

MEMORANDUM OF UNDERSTANDING BETWEEN THE NATIONAL CONFERENCE OF STATES ON BUILDING CODES AND STANDARDS, INC. AND THE NATIONAL BUREAU OF STANDARDS

I. INTRODUCTION

The National Conference of States on Building Codes and Standards (NCSBCS) was formed in 1967 in response to "the need for intergovernmental reforms in the area of building codes," as recommended by the Advisory Commission on Intergovernmental Relations.

From the inception of NCSBCS to October 1976, Secretariat services were provided NCSBCS by the National Bureau of Standards (NBS). These services included administrative and technical support. The authority to furnish this support is contained in sections 2(d) and 3 of the NBS Organic Act (15 U.S.C. 272(d), 273).

Many technical studies and much research have been carried out in the Center for Building Technology (CBT) of the Institute for Applied Technology (IAT) at NBS, as a direct result of stated needs by NCSBCS. Examples of such programs include the Laboratory Evaluation and Accreditation Program, Coordinated Evaluation System, Uniform Regulation of Manufactured Buildings and Mobile Homes, and Energy Use Criteria for Standards. The use of these programs by NCSBCS has effectively contributed to the NBS goal of transferring research results and up-to-date technology to the States and ultimately the building owner and user.

With recent growth and development, NCSBCS has matured to the stage of becoming an incorporated entity with administrative self-sufficiency and independence. When NCSBCS entered into contractual agreements with other Federal Government agencies, it realized, as did NBS, that administrative and logistical support by NBS should be transferred from NBS to NCSBCS, while technical research support should be enhanced so as to further the goals of both organizations.

II. PURPOSE

The purposes of this agreement are to: (1) set forth a commitment of continued mutual support between NBS and NCSBCS; (2) establish a procedure for appropriate joint program planning and continued technical cooperation between the two organizations; (3) outline the general conditions under which NBS and NCSBCS cooperative efforts will be formulated and conducted; and, (4) set forth those technical and other services to be provided either organization by the other.

Through this cooperative effort, both organizations can work together toward the common goal of improving the building regulatory system through the application of research and technology. This work will contribute to the public welfare by providing a safer, more healthful built environment at less cost.

III. STATEMENT OF INTENT

The past relationship between NBS and NCSBCS proved to be beneficial to both organizations in developing and applying building technology to the special problems encountered in building regulation. It is, therefore, agreed by both organizations that close cooperation and contact will be maintained in the future so as to being the resources of both organizations to bear on national problems related to (1) deficient and needed new standards and codes for building regulations, and (2) inadequate processes for regulating building design and construction.

1. NBS will carry out technical and research activities for NCSBCS in the following areas:

a. NBS agrees to provide technical advice and consultation to NCSBCS—its Board of Directors, Committees and individual States, when requested, in areas in which NBS possesses scientific and technological expertise, within the limits of funds and manpower available and consistent with existing policy regarding such services. Requests for such services will be made in writing.

b. NBS agrees to provide NCSBCS with the latest NBS technical reports, publications and other results of current NBS building research related to building regulatory concerns.

c. NBS agrees to undertake research for NCSBCS on building regulatory concerns of national interest, when appropriate and subject to existing resources and programmatic limitations. Such research will be conducted on a cost reimbursable basis, when appropriate, under authority of section 7 of the NBS Organic Act (15 U.S.C. 275a) and in accordance with NBS Project Acceptance Criteria. Any such cost reimbursable research will be undertaken by NBS upon execution of a written research agreement between the two organizations.

d. NBS agrees to duly consider the regulatory research needs of the States as expressed by NCSBCS in planning the NBS building research program.

e. NBS agrees to furnish technical expertise to the NCSBCS Standing Committees. NBS agrees to furnish an appropriate technical staff person to participate in the activities of each of NCSBCS's four Standing Committees: (1) Education and Qualification, (2) Codes Administration, (3) Reciprocity, and (4) Standards and Evaluation, and others as mutually agreed upon. This technical support will be provided by NBS to NCSBS at no cost to the latter organization. These staff persons will be Associate Members of the respective committees and will be selected by the Chief of the Office of Building Standards and Codes Services, Center for Building Technology. Committee participation shall be in accordance with Arcticle VIII, Section 1 and Section 2, of the NCSBCS Bylaws dated September 23, 1976.

2. NCSBCS will carry out studies for NBS and implementation activities based upon NBS research results in the following areas:

a. NCSBCS agrees to undertake surveys, data gathering and other studies related to the building regulatory system for NBS, as requested by NBS, when appropriate and subject to existing funds and manpower limitations. Such activities will be conducted on a cost reimbursable basis through an appropriate contract with NBS.

b. NCSBCS agrees to annually prepare and submit to NBS a written list of high priority research needed to address building regulatory and related problems.

c. NCSBCS agrees to share with NBS nonconfidential progress and other programmatic reports relating to building technology, standards and regulations.

d. NCSBCS agrees to implement NBS building research results when and where appropriate and within limits of resources.

IV. MODE OF OPERATION

In order to facilitate the intent of this agreement, the mode of operation will be as follows:

1. NBS and NCSBCS agree that all cooperative activities shall be funneled through a principal point of contact within each organization. These points of contact are to be the Chief of the Office of Building Standards and Codes Services, Center for Building Technology, Institute for Applied Technology, NBS, and the Executive Director of NCSBCS. To facilitate cooperative activities, the Chief of the Office of Building Standards and Codes Services shall also serve as a Technical Advisor to the NCSBCS Board of Directors.

2. Any information resulting from NCSBCS-supported research at NBS of benefit to the general public will be provided to NCSBCS for either release or approval for NBS to release. Any release of such material by NCSBCS will indicate the source of the research and any release approved for issuance by NBS will acknowledge the support of NCSBCS. NBS will retain the privilege of individual scientists publishing findings resulting from NCSBCS supported research in professional journals and archival literature.

3. Any information resulting from NBS-supported research by NCSBCS of benefit to the general public will be provided to NBS for either release or approval for NCSBCS to release. Any release of such material by NBS will indicate the source of the research and any release approved for issuance by NCSBCS will acknowledge the support of NBS.

V. TERMINATION

NCSBCS and NBS agree that this Memorandum of Understanding may be terminated by either party 60 days after notifying the other party in writing.

[The following information was subsequently received for the record:]

QUESTIONS OF THE COMMITTEE AND THE ANSWERS THERETO

Question. Mr. Wolfe, you are fairly strong in your prepared testimony about the need for continuing the Center for Building Technology and the Center for Fire Research. Where would your organization have to turn in order to get needed research performed if the Centers were disbanded?

Answer. As contained in the responses received in our state survey (Survey of State Resources for Building Technology and Fire Safety Research), the states and our organization have no where to turn in this Country to have the building technology and fire-safety research projects conducted should the National Bureau of Standards' Centers for Building Technology and Fire Research be disbanded. No where in this Country is there in one location the unique research facilities nor the technical expertise to carry out those projects which the states have requested of the National Bureau of Standards. In our recent discussions amongst ten western and midwestern state delegates, it was agreed that the best which the states and the Conference would hope to accomplish should the Centers be disbanded, would be to try and pool the very limited state funds to identify private or university testing facilities which could be contracted to conduct, on a very limited scale, one or at most two, of the dozen major research projects we currently have before these two National Bureau of Standards' Centers. Since none of the 30 states which responded to our recent survey currently have line items in their budgets to fund such research, I would like to stress to the Subcommittee our belief that it would be highly improbable that state legislatures would appropriate funds for such a consortium research effort should the Bureau's Centers be disbanded.

Question. In what way is the national laboratory reimbursed for this work?

Answer. Under the terms of the Conference's Agreement of Cooperation with the National Bureau of Standards (a copy of which was submitted with my written testimony), the states, through NCSBCS, agreed to provide "in kind" services to the Bureau together, and prioritize state building and fire safety research needs which the Bureau could then use in establishing their annual research agenda. In exchange, the Bureau agreed to provide the states on an "in kind" services basis, with the results of their subsequent research.

On occasion, states do directly pay the Bureau to conduct special research projects. These projects, however, are initiated outside of the NBS/NCSBCS Agreement of Cooperation.

Question. What, in your opinion, would be the immediate and long-range effects of disbanding both CBT and the CFR?

Answer. Uniformly, our states have responded that the immediate effect of disbanding both the Center for Building Technology and the Center for Fire Research would mean an immediate halt to research in the building and fire-safety areas. As a representative from the State of Utah noted this week, "all of our small states would end-up enforcing building codes and fire-safety regulations in a research vacuum."

In the long-range, our states uniformly have noted that they will be unable to fund or even locate adequate facilities to conduct the vital building technology and fire-safety research now being conducted by the National Bureau of Standards. Indeed, in our recent meeting in Salt Lake City, Utah, all of the attending states expressed concern that without an adequately funded Center for Building Technology and Center for Fire Research, America's leadership role in building technology and fire safety would be badly, if not irreparably, damaged. As noted in my written testimony, the research conducted by CBT and CFR play a critical role in our Nation's voluntary standards system. The Conference knows of no other government agency or private facility that could fill that role should CBT and/or CFR be disbanded.

Senator GORTON. We are adjourned.

[Whereupon, at 10:50 o'clock a.m., the subcommittee recessed subject to the call of the Chair.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C., February 23, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space, U.S. Senate, Washington, D.C.

DEAR SLADE: I understand that on March 6, 1984 the Science, Technology and Space Subcommittee will hold a hearing to examine, among other things, the Administration's proposal to eliminate funding for the Center for Building Technology, a division of the National Bureau of Standards.

I am familiar with the work of the Center, and I urge that the Administration's proposal be rejected. In 1981, when the tragic skywalk collapse occurred at the Hyatt Regency Hotel in Kansas City, there was a need for a thorough investigation by an expert, impartial body. Senator Eagleton and I called upon the Center, and investigators were there within the week. CBT's professional, unbiased work is generally credited with the successful reaching of quick, out-of-court settlements in the wake of that catastrophe.

I would hope that there will be no more structural failures in this country but, unfortunately, such good luck is unlikely. Structural collapses, like airplane crashes, must be investigated, and the federal government is in the best position to provide this service. The CBT serves a unique and vital purpose, and should be preserved.

Last year the Administration made this same proposal, and the Commerce Committee rejected it by reporting legislation to reauthorize CBT at its full fiscal year 1983 funding level of $4.009 million. Subsequently, the CBT received an appropriation of $3.174 million. I strongly recommend renewal by the Subcommittee of the Center's authorization, and I will support such action when the full Committee takes final action on the National Bureau of Standards' authorization.

As always, many thanks for your interest and cooperation.

Sincerely,

JOHN C. DANFORTH.

U.S. CONSUMER PRODUCT SAFETY COMMISSION,
Washington, D.C., March 5, 1984.

Hon. BOB PACKWOOD,
U.S. Senate, Washington, D.C.

DEAR SENATOR PACKWOOD: In response to your inquiry regarding the Consumer Product Safety Commission's reliance upon the Center for Fire Research at the National Bureau of Standards, I am pleased to provide the following information.

Section 29(d) of the Consumer Product Safety Act states, "The Commission shall, to the maximum extent practicable, utilize the resources and facilities of the National Bureau of Standards, on a reimbursable basis, to perform research and analyses related to risks of injury associated with consumer products (including fire and flammability risks), to develop test methods, to conduct studies and investigations, and to provide technical advice and assistance in connection with functions of the Commission."

In the fire area, the capabilities of the Center for Fire Research (CFR) at the National Bureau of Standards (NBS) are unique and of the highest quality. This is true, not only in terms of personnel expertise, but also in terms of equipment. Some of the NBS equipment, such as the furniture calorimeter, is available nowhere else in the United States. In addition, the center can draw, on short notice, on expertise from a variety of other disciplines (chemistry, physics, etc.) within NBS as the need arises.

Elimination of the Center for Fire Research, its personnel, equipment and information center would severely affect the Commission's programs and activities in the fire area. A number of the Center's fire programs are funded or partially funded by the Commission. Specific projects and CFR's activities related to these are:

1. UPHOLSTERED FURNITURE FLAMMABILITY

CFR has, for several years, provided much of the technical expertise for the Commission's priority program on cigarette ignition of upholstered furniture. This support has been invaluable. In 1983, the furniture industry incorporated new materials and techniques which laboratory tests indicate will further improve the cigarette ignition resistance of upholstered furniture. These modifications were developed jointly by industry, CPSC, and CFR. A program to evaluate their effectiveness in retail furniture is in progress. The Commission, In fiscal year 1984, is extending the upholstered furniture flammability work to investigate a second major hazard area, that of open flame ignition. CFR is investigating this aspect for the Commission, with the initial objective of develping a test method to measure the ease of ignition of upholstered furniture by small scale open flame sources. An important part of the open flame work will be full scale furniture burn tests using the furniture calorimeter.

2. TOXICITY OF COMBUSTION PRODUCTS

One of the Commission's priority areas is that of combustion toxicity. CFR has developed a research test procedure for assessing the acute inhalation toxicity of combustion products. Further test development work, of the type now being carried out by CFR, is needed before a test procedure suitable for ues in regulatory standards is available.

3. PLASTICS FLAMMABILITY RESEARCH

The understanding of fire growth in household furnishings is the focus of this plastic flammability project at CFR. The project has as its objective the development of small scale test methods to predict real fire behavior by knowing the fire behavior characteristic of the combustible materials, and by knowing how these materials are used in household furnishings. For this work, instruments such as CFR's furniture calorimeter are essential. Small scale tests have been developed for use with mattresses and upholstered furniture. CFR's expertise is needed now to train Commission personnel and to provide continuing advisory services.

4. HEATING EQUIPMENT

Over the past few years, a rapid increase in the use of alternate heating sources, such as coal and wood burning stoves, gas space heaters, kerosene heaters, etc. have occurred. With these have come a wide range of fire safety problems such as the build-up and ignition of creosote in chimneys, improper installation of chimney connectors and chimneys, substitution of gasoline for kerosene, etc. Information on the fire hazards involved and requirements for proper installation and maintenance are needed for use in codes and standards and for dissemination to consumers. This needed information is being developed by the Center for Fire Research.

5. OTHER ACTIVITIES

The Center for Fire Research has supported the Commission directly or advised us informally on a series of other subjects which are extremely important to the Commission. Examples include smoke detectors, fire modeling, smoke masks, mattress flammability, apparel flammability, fire data analysis, etc.

In conclusion, the Center for Fire Research represents the central technological and scientific foundation for one of the Commission's major programs, the Fire and Thermal Burn Hazards Program. This capability is virtually unavailable elsewhere. Loss of the CFR would severely hamper this agency's task of reducing the unreasonable risk of injury associated with the flammability of consumer products.

I hope this information is helpful. Please let me know if you have any further questions.

Sincerely,

NANCY HARVEY STEORTS, *Chairman*.

STATEMENT OF A.G.W. BIDDLE ON BEHALF OF THE COMPUTER AND COMMUNICATIONS INDUSTRY ASSOCIATION

Mr. Chairman, members of the subcommittee, my name is A.G.W. Biddle. I am President of the Computer and Communications Industry Association (CCIA), an organization comprised of the chief executive officers of some seventy leading manufacturers of computers, data storage systems, data terminals and telecommunications equipment and services. Together our member firms generate approximately seven billion dollars in annual revenues in these products and employ several hundred thousand U.S. citizens. I think it is also significant to point out that our member companies export about three billion dollars a year worth of our industry's products, and collectively pay over three hundred million dollars in taxes on corporate profits into the U.S. Treasury. Furthermore, these firms are growing--during normal times—at a rate of 25 percent to 30 percent per year.

I have asked to testify before this Subcommittee because I am vitally concerned about the role that the Institute of Computer Sciences and Technology must play in the long-term health and vitality of our industry—both in the U.S. and overseas.

The thrust of my statement deals with six main questions. These are:

Why standards?

Who should set them?

What happens if we don't have standards?

What role do standards play in our international competitiveness?

Why must the Government be involved?

What is behind the effort to eliminate ICST?

My focus in attempting to provide answers to these questions will be on the computer and telecommunications industries, because this is where the need for appropriate standards is greatest and where I believe I have some expertise.

WHY STANDARDS

As you know, the computer industry for all intents and purposes is less than thirty-five years old. During the first half of that period, data processing was highly centralized. We all remember the glass enclosed, air conditioned "IBM" room. Shopping carts full of information were trundled into a room full of key punch machines and operators, the data converted to punched holes in cards and fed to the computer for processing. In due course, reams of paper were produced and distributed back out to those who needed information. Typically, the equipment used was designed, manufactured, installed and maintained by a single supplier. In the truest sense, it was bundled and tied together by pricing and technical strategies intended to lock the customer into a sole source relationship with the vendor.

The manufacturer established the internal standards to facilitate the interconnection and interoperability of the various elements of its system and sought to minimize possible interchangeability or interoperability with devices or systems produced by competitors. The centralized and isolated nature of data processing at the time imposed few penalties on the end user as a consequence of the lack of industry standardization of the interfaces and protocols needed to allow compatibility between systems and devices. Similarly, the high cost and poor quality of available datacommunications Circuits limited the amount of data transmission taking place, and thus limited the need for protocols and standards to cover such things as message formats, data encryption and transmission protocols.

By contrast, over the past decade we have seen our technology move us into a new world of distributed processing with an ever growing need for the movement of data between large computers, desk top "personal" computers, word processors, printer/copiers and industrial robots through terrestrial and satellite circuits across town and across continents.

These complex networks cannot function without standard interfaces, standard protocols and standard computer languages. Without all three there is chaos. The requisite standardization can take place in but one of two ways. Either the dominant firms in the industry, in this instance IBM and AT&T, unilaterally establish de facto standards for the interoperability of their respective product lines and the user, be it private sector or government, limits his procurements to a single vendors' product line for all of his needs; or alternatively the industry could, through the voluntary consensus standard-making process, develop the necessary standards to allow the user to procure the best devices available from a variety of vendors and be assured that they would be able to function efficiently as part of an integrated system. One would like to assume that our industry would have opted for this alternative and, having made the application of our products easier for the end user, seen the market expand even more rapidly than it has. Unfortunately, I have to report that our industry has a propensitity to shoot itself in the foot when it comes to the establishment of standards.

While the voluntary standards process drags on, often for a decade or more, the dominant firms impose a de facto standard upon the user community that then serves to perpetuate the dominant firms' position in the Marketplace. The lack of an industry standard serves to protect the perpetuate the market share held by each participant and restricts new participant entry by breaking the market into small segments that are uneconomic to enter.

The result of all of this is chaos and confusion for the user. My word processor can't talk to your word processor, and in all probability my computer can't communicate with your computer, nor will the program you write for your computer run on my computer.

In other, more mature industries, the consumer would have used his or her purchasing power to bring a halt to such rampant inefficiency. In this one, the consumer, with one possible exception, has been passive and done little to pressure the industry into developing and implementing the standards that are so desperately needed. That one exception, which I will comment on further later in my testimony, is the U.S. Government in its role as the single largest user of our industry's products.

WHO SHOULD SET STANDARDS

Ideally, the manufacturers of computer and communications equipment and the users of their products should join together to develop the standards necessary to provide compatibility and interoperability. However, as now constituted, the voluntary standards process mitigates against this. First, as I noted before, many of the larger manufacturers don't want standards for fear that the additional competition that would result would erode their respective market shares. On the other hand, the user community generally lacks the technical expertise and the patience to effectively participate in the process. Consequently, they tend to default to the manufacturers, even though to do so is counter to their own best interests.

The exception to this pattern has been the U.S. Government which expends about 10 billion dollars per year for ADP. Under the aegis of Public Law 89-306, the Brooks, Act, ICST has been delegated the responsibility to develop and promulgate standards for use by the Government in the procurement and application of data processing equipment and to provide technical assistance to Federal agencies in their use of ADP resources.

It is in this capacity that ICST played a leading role in the development and adoption of vitally needed standards in the areas of data encryption, central processor to peripheral device interfaces and protocols, and data communications standards and protocols. While carrying out their Brooks Act mandate, ICST has also made a substantial and increasingly important contribution to the entire community of users in the private sector. As a result, a very small Federal expenditure has been leveraged in three important ways. First, the Government's use of computer and communications technology has become more effective and efficient. The flow through of these improvements to private sector users has in turn spread the cost of implementation across a substantial portion of our industry's output, rather than only the Government's 7 percent share. And finally, the improvement in efficiency and productivity of the private sector user community increases our domestic efficiency and international competitiveness.

These gains have been a direct result of ICST's leadership and of the active participation by highly qualified ICST personnel in the voluntary standards process.

1. Through ICST's involvement, the government, as a major customer of the industry, is better informed as to underlying technological developments and trends.
2. The presence of ICST personnel accelerates the standards making process by making it more difficult for some manufacturers to employ delaying tactics for self serving purposes.
3. The implied threat that the Government, through ICST, can and will develop its own standards if the industry fails to when it is in the taxpayers' interest is in and of itself a major incentive toward the formulation of voluntary standards.

As I noted earlier, the preferred solution to the computer and communications industry's standards problems lies in a cooperative effort between the producer community and the user community. However, until the private sector user community recognizes that the inefficiencies that result from incompatibility between systems will be eliminated only through a refusal to purchase the incompatible product, the Government has an important role to play. Part of that role is to insure that the necessary standards are in place to provide compatibility and interoperability between federal computer and communications systems and subsystems. Another part is to insure that our rapidly developing information technologies contribute to our total national welfare.

WHAT HAPPENS IF WE DON'T HAVE STANDARDS

The lack of standards during the early part of our industry's history served to lock the user into the products of a single vendor and to restrict his migration path only to new and larger systems provided by original supplier.

In today's world of interactive real-time networks this has become an extremely serious problem. No vendor is capable of being all things to all people. Of necessity, the user must be able to integrate and efficiently use systems made up of products produced by a multitude of producers. That user must be able to adapt the system to his needs on an evolutionary basis. Without the requisite standards, this is impossible. Without standards, each manufacturer's product is an island unto itself contributing to the Tower of Babel that is now the information age.

THE ROLE OF STANDARDS IN OUR INTERNATIONAL COMPETITIVENESS

Just as a few dominant firms in our industry have recognized the role that control over standards plays in obtaining and maintaining market share, so have our rivals in the international marketplace. France, Germany, Japan and England have all embarked on aggressive Government-financed programs to develop and implement various data processing and telecommunications standards aimed at enhancing their respective world market shares. The success of the Japanese in virtually monopolizing various U.S. consumer goods markets has resulted from the early development of standards under the auspices of their government, and then penetration of world markets as a consequence of large economies of scale based on that standardization.

As these national strategies are implemented, U.S. computer and communications equipment manufacturers will find it increasingly difficult to build to serve the U.S. market and also to serve overseas markets that are governed by inconsistent standards.

ICST has been playing an extremely important role in the increasingly important international standards arena. The representatives to the international standards bodies from the other industrialized nations are government sponsored and typically are employees of government-owned organizations with close ties to the international trade policies and objective of the sponsoring country. The United States has no counterpart to participate in this process. The American National Standards Institute (ANSI), the umbrella group to the voluntary standards community, has no official status. The Department of State, which has the power to represent the United States in such international meetings, has little or no technical competence not an ongoing communications link with the private sector.

At the urging of this Committee, ICST has successfully stepped in to fill this void and become an able and effective representative for U.S. interests in the international standards arena. Had they not done so, I am confident that our industry's now very positive balance of trade would already be seriously eroded. I believe that it is vital that this effort go forward and that additional resources be focused on the creation of a unified set of standards and protocols for the efficient use of our industry's goods and services both domestically and internationally.

WHY MUST THE GOVERNMENT BE INVOLVED

First, because huge savings have and will continue to be made through the intelligent utilization of our industry's goods and services for the management and operation of the Government itself. I would estimate that the Federal Government spent in excess of 10 billion dollars for data processing equipment and services and at least another 10 billion dollars for telecommunications last year alone.

The opportunities to improve the return on these investments, enhance the delivery of Government services, and increase government efficiency are tremendous. The General Accounting Office, on more than one occasion, reported millions of dollars of savings that can or have directly resulted from ICST's efforts and output.

It would seem to be extremely short-sighted to reduce or eliminate for budgetary reasons ICST activities which have been demonstrated to directly save the taxpayer many times over the dollars expended. Ten million dollars per year to more intelligently procure and utilize 20 billion dollars a year worth of goods and services seems to be an extremely small price to pay for all that has and can be attained.

Furthermore, ICST's activities flow to the benefit of private sector users and contribute directly to significant gains in efficiency and productivity virtually everywhere our industry's products are used. These gains in productivity in turn flow back to the Government in the form of new jobs and increased tax revenues.

WHAT IS BEHIND THE EFFORT TO ELIMINATE ICST

Although the principal responsibilities of ICST were legislatively established in 1964 with the enactment of the Brooks Act, the organization was funded at a level below $4.5 million through fiscal year 1978. As a result of efforts by your Committee, the House Government Operations Committee, and our Association, the Institute's budget was increased to $11.2 million in fiscal year 1979.

At last ICST was able to assemble the qualified technical talent and requisite support equipment to address the myriad of standards-related problems facing the Government as a user. During the past five years substantial progress has been made toward identifying the impediments to the efficient use of computer and communications technologies, encouraging the private sector to develop needed standards on a timely basis through voluntary consensus and, when necessary, adopting Federal Information Processing Standards (FIPS) when the private sector drags its heels to the detriment of the Government as a user.

As noted earlier, a few of the larger producers in this industry seek to stabilize their market share through the maintenance of product differentiation at the interface between their hardware and software. This maintains a technological bundle and ties the offerings of a vendor so that a competitor cannot offer a compatible product.

The fact that ICST has become increasingly competent in performing its assigned mission has disturbed some of the producers and led to a substantial lobbying effort aimed at elimination of the Institute. The proposed budget that you are now considering is, I believe, a direct outgrowth of that lobbying.

The opponents of ICST contend that they are merely trying to eliminate one more unnecessary Federal regulatory activity. The truth is ICST performs no regulatory function. It does, by Congressional mandate, seek to increase the efficiency of the Government's use of data processing and telecommunications equipment and services. The courts have clearly stated that the Government has the right to establish specifications for the products it procures, and the private sector has the right to refuse to compete for the Government's business if it finds those specifications onerous. The success that ICST has achieved to date in moving towards increased compatibility and interoperability of information systems threatens the entrenched position of a few vendors and has resulted in this effort to eliminate the perceived source of the problem.

Similarly, the vital role that ICST has in the international standards area is of no great import to those who seek to eliminate ICST as those companies largely manufacture overseas what they sell overseas and are thus not seriously threatened by a proliferation of standards that are unique to each country. But if the United States does not effectively participate in the setting of international standards, the several thousand smaller U.S. firms that export from U.S. plants will be driven out of those markets and their market shares absorbed by the dominant firms. If this effort to reduce ICST's budget and effectiveness is successful, it will result in significant domestic job losses in our industry and a substantial reduction in our industry's current $7 billion dollar positive balance of trade.

IN CONCLUSION

The covergence of computers and communications and the rapid dispersion of computer technology into every business, and soon every home, in America requires the timely development and implementation of both hardware and software standards to protect the integrity of data, permit its rapid movement between systems and subsystems, and allow the user the opportunity to optimize his or her network or system to his or her specific needs.

An organization must be in place with the stability and resources necessary to monitor developments in the underlying technology, identify evolving user needs and work with the industry to develop the necessary anticipatory standards before entrenched market positions block their adoption. This same organization can and should provide the means to resolve standards issues between manufacturers in a manner that conforms with the intent of our antitrust laws. It should also have the resources and authority to represent U.S. interests before international standards organizations.

The nucleus of the organization I have described exists in ICST. Instead of cutting its budget by more than two thirds, we should be increasing it significantly. Dollar-for-dollar it is one of the most productive expenditures the Federal Government makes.

Thank you.

STATEMENT OF INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

This is to submit the views of the International Association of Fire Fighters (IAFF), AFL-CIO-CLC, representing approximately 170,000 professional fire fighters throughout the country, to the Senate Science, Technology and Space Subcommittee on the issue of funding for the Center for Fire Research (CFR).

As you will recall, during last year's budget deliberations the Administration recommended no funding for the CFR. However, the Center continued its existence after Congress authorized and appropriated funds for its continued operation. This year the Administration once again is seeking to eliminate the CFR, and no monies have been included in the President's budget proposal for fiscal year 1985.

The IAFF is in strong support of the Center for Fire Research and respectfully requests that the Committee and Congress assure its continued existence by including adequate funding for the Center in fiscal year 1985 authorizations for the National Bureau of Standards.

The consequences of eliminating the CFR would be grim, since the Center carries out some of the most sophisticated research in fire prevention and control methods in the country. Advanced fire research is essential if our nation is to improve fire safety codes, standards and regulations. The budget savings that the elimination of CFR provide would be offset many time over by the savings in lives and property that its work contributes to.

With the elimination of the CFR vital research would be lost and basic knowledge of how fire spreads, how to minimize fire damage, and how to design safer fire environments would cease to grow. A significant area of research which the CFR has spearheaded, studies the toxic effects of burning building materials and furnishings. With seventy-five percent of all fire deaths in building fires in the United States being caused by toxic fumes from burning materials, continued research is absolutely vital for saving numerous lives.

Other areas of significant research by the CFR include studies into fire endurance of building structures and the development of fire safety standards for heating, ventilating and air conditioning systems which play a major role in the spread of smoke and fire.

Research in these areas demands sophisticated technology and relies on the expertise of a variety of scientists and other professionals. Elimination of the CFR in 1985 would come at a time when fire research is making dramatic improvements through the use of modern technology that can be used to significantly decrease losses in life and property due to fire. The research environment that is necessary for continued progress can only be provided through a national center such as the CFR.

For these reasons the IAFF requests that adequate funding for the Center for Fire Research for fiscal year 1985 be authorized by the Committee during its current deliberations.

NATIONAL CONFERENCE OF STANDARDS LABORATORIES,
NATIONAL BUREAU OF STANDARDS,
Boulder, Colo., February 7, 1984.

Senator BOB PACKWOOD,
Chairman, Senate Committee on Commerce, Science, and Transportation, Hart Senate Building, Washington D.C.

DEAR SENATOR PACKWOOD: The National Conference of Standards Laboratories continues to be concerned about the budget for the National Bureau of Standards—specifically in support of those aspects of NBS activities relating to development of physical standards of measurement and their dissemination through calibration services. Research and development costs for measurement assurance programs are proposed in the 1985 budget to be wholly provided by user fees; similar costs for development of standard reference materials are proposed to be shifted to user fess over the next several years. These and other proposals concern our membership and the measurement community in general.

We would appreciate the opportunity to testify before your Committee when it considers this topic on March 6, 1984. Prior to that date I will provide you with the details of our concerns which will form the basis for our testimony

Sincerely,

George O. Rice,
President.

Enclosure.

Statement of the National Conference of Standards Laboratories

INTRODUCTION

It is a privilege for us to represent the industrial segment of the National Conference of Standards Laboratories in this written testimony to this Committee. The NCSL was founded about 22 years ago as a means of fostering communication and education in the management of this nation's standards laboratories. From an early beginning the NBS has been the sponsor of the NCSL providing it initially with single point of focus and credibility and over the years a continuity of permanence. In the years since its founding, the NCSL has grown to a membership of something more than 600 laboratories throughout the world, approximately 500 of which are domestic non-government laboratories. some of these "industrial" members are small businesses, while others are large; some are independent, others are components of larger companies. For some, their business is that of providing a commercial service while for most it is to perform calibration support for the parent company.

Our industrial membership and, we believe, most Americans are as concerned about the size of the Federal deficit as most of you. We recognize that the Federal budget is a means whereby priorities may be set among competing government activities with differing perceived benefits to society. We also are aware that the budgeting process is correctly a political one which allows for determining those societal benefits, for setting priorities and for limiting the economic damage to the future which could result from excessive deficits. Our plea is that you consider the long term effects on the NBS—its capabilities and the way it provides its services—and the slowness with which those effects are seen in industry and commerce.

NCSL INVOLVEMENT

Last year, for the first time since its founding, the NCSL became actively engaged in discussions of the NBS budget. This followed our prior year's interest in the Congress' consideration of revising the enabling legislation (Organic Act) for the NBS. We are neither professional lobbyists nor captive surrogates for the Bureau; rather, we are concerned users of NBS services. We are supportive of the Bureau in its programs which meet our perception of the nation's measurement needs. We are critical when those programs do not appear to address those needs either qualitatively or quantitatively. For example we deplored the reduction in services offered during the late 70's and the perceived deterioration in the quality of those services. We also applaud recent actions in the Bureau to upgrade these services by selective staff increases and equipment improvements. The proposed budget before you has similar overtones. We support the $2.5M increase suggested for process quality control but are disappointed that the full $13.5M was not proposed.

Within our area of interest we frequently have been called upon (together with other users of NBS services) to assist in assigning priorities to the several competing services. For the most part we think this has worked well. However, it is difficult or impossible for us to prioritize work in support of our needs relative to other work carried out by the Bureau. We suspect it would be equally difficult for those involved in other arenas (e.g., building technology, fire research, research into fundamental constants, etc.) to determine the importance of that work relative to these measurement services.

In some cases these other areas are considerably more visible than measurement services and the direct constituency is both larger and more vocal, perhaps even more persuasive. Our task is not to try to convince you that these other areas are less important than calibration services. Our task is to try to convince you that measurement services represent a fundamental mission of the Bureau requiring your careful consideration and reasoned judgment.

SPECIFIC AREAS OF CONCERN

In our review of the NBS fiscal year 1985 budget proposal we limited ourselves to those aspects which are of interest to our industrial membership: the industrial calibration and standards laboratories of the nation. We did not examine the issues involved in such areas as fire research, building technology, computer research, biotechnology research, etc. We believe these topics, however important, will receive support from other constituencies whose interests lie with these concerns. We are concerned with the adequacy of calibration services provided—including MAPs and SRMs. We firmly believe providing these services which affect commerce and manufacturing in defense and commercial areas is a fundamental mission of the Bureau. Therefore, we have more than a passing interest that this vital activity receive the attention it deserves. It is our judgment that this Committee could do no greater service to the technical strength of the nation than to prevent the continuing deterioration of this important facet of the NBS.

Areas of the NBS budget of concern to us are: R&D supporting calibration services (generally) and MAPs (specifically); R&D supporting SRMs; Measurement services quality control and documentation; Training services, including seminars and publications; and Existing and emerging measurement needs.

COMMENTS ON SELECTED SPECIFIC AREAS

For a number of years our membership has become increasingly concerned about the deterioration of services provided by the Bureau—specifically calibration services. The effects are slow to mature and even slower to be perceived. Reduction in budgeted amounts for support of calibration services, reprogramming of calibration service funds and personnel to other mandated tasks, loss of personnel (to retirement or other areas of government service) without replacement, and failure to upgrade equipment and technical capabilities have all contributed to this increasing concern.

Calibration services are usually not glamorous nor do they attract high political visibility; rather, they include the vital day-to-day activities essential to commerce, industry and—yes—to research and development, in all sectors of the American economy. They depend upon a research base which continually strives to improve upon our knowledge of measurement phenomena, the sources of measurement error, and the means to reduce that error or to otherwise compensate for it.

Last year the Administration proposed that the research and development funds for Measurement Assurance Programs (MAPs) be deleted from the Federal budget and that these costs be recovered from the users of the MAP services. The Congress decided that such a step should not be taken precipitously and, accordingly, restored 80 percent of the money with direction that the NBS initiate a study to determine the effects of selected price increases on the demand for calibration services. The Congress further directed that these funds be "ramped" down at 20 percent per year with so-called user fees being increased to provide the resource for continuing research and development of these services. Before the study has been completed, the Administration has again proposed complete elimination of the $1.2M for MAP R&D which would have been the FY85 amount.

Initial results of the study aimed at determining the impact of price increases for selected services upon the demand for those services indicates a disturbing conclusion. On the one hand total income generated by the fees has remained about the same; however, the number of services requested has declined. The impact of the decline is the ultimate deterioration (or, at best, the failure to improve) the measurement base for industry's quality control programs.

Measurement Assurance Programs (MAPs) are more advanced methods for transferring quantities of measurement to the measurement commuity. Basically, MAPs serve to quantify the total uncertainty in the measurement process including the equipment component, the environment component, the method component and the human component. (The classical calibration service of the Bureau merely identifies the equipment component of uncertainty; all other components are either ignored or are attempted to be estimated by the user.) This ability to quantify the total uncertainty makes a MAP a significantly more powerful method of disseminating the various national standards to industry.

It has been mentioned by some that the services provided by the Bureau can easily be afforded by the larger companies which use those services. Although we could argue that point our purpose here is not to defend the larger companies. The NCSL has many small organizational members (and there are numerous small firms not yet members of the NCSL) which are certainly among those for whom we are appearing. No firm—large of small—has, as far as we know, ever suggested that

NBS calibration services be provided free. We have always supported the idea that a fee should be charged; this fee should be set to recover the operational costs incurred by the Bureau to provide that service. However, we strongly object to the concept that NBS research and development—a function which will benefit the nation as a whole and for which the beneficiaries are unidentifiable members of our society who may use that service in the future—be paid for out of user fees for current, possibly unrelated, services. Yet that is just what is proposed in this budget and what was agreed to in principle by the approval of the FY84 budget. Of the number of services which the NBS provides to the public, few have the "point of sale" identification as do calibration services and SRMs. This identification has made it easy to suggest that the users (purchasers) of these services are beneficiaries of a government function and that they should be expected to pay in total for that function. However, present users of a service are not necessarily the beneficiaries of research and development conducted for future services. Thus, identification of the beneficiaries is not possible and users of today's services should not be required to underwrite the costs of that research on a "pay as you go" basis.

Based on the words in the Organic Act it is not necessary that the fees charged for calibration services recover their costs. Rather, it is clear that the fee be "reasonable." It is surmised that reasonableness of the fee was to be determined partly on the cost to provide the service, partly on the basis that more users should be encouraged, and partly on the basis that small company users should not be frozen out because of price. Implicit in these considerations is the necessity to have some price set which would discourage frivolous or unnecessary use of this valuable resource but which would encourage necessary or desirable use.

We do not here, however, argue that the $1.2M for MAP R&D be restored as such. Rather, we support the proposal that the $1.2M be restored and then reprogrammed to the entire calibration services section of the budget. We strongly believe that MAPs are merely one means of transferring a quantity to the public and, therefore, are only components of the larger calibration service function. Contrary to information provided by others, MAPs are not just for laboratories involved in state-of-the-art measurements. MAPs are important to any laboratory interested in quantifying the total uncertainty of its measurement process, regardless of the size of the uncertainty. User uncertainties vary according to the equipment available and to the methods employed as well as to the technical competence underlying the measurement made by the laboratory.

The reduction in calibration services offered by the NBS which accompanied budget and staff reduction in those areas responsible for the services has also been felt by industry. In some cases, alternate sources for these services have been located (e.g., calibration services for reference magnets which had been discontinued by the NBS are available to defense contractors from the Navy's Primary Standards lab). Some companies have elected to purchase such services from the NRC of Canada whose policy relating to funding research and development in measurement and standards areas is more appealing then is U.S. policy and whose fee structure—even considering the surcharge applicable to non Canadian users—is considerably more attractive than that of the NBS. These areas are little more than stop gaps; the need exists for the NBS to provide these services at a reasonable price.

Examining alternatives to the measurement services now provided by the NBS is complicated by the fact that at some point in the measurement hierarchy a measurement service by the Bureau will be necessary. Although it is true that most derived measurements can be linked in a hierarchy to the Bureau's basic references the cost to the nation could be staggering. This country, unlike most of our trading partners, does not have a formalized government system of calibration services. In some countries this is carried out by various levels of government laboratories, in others the levels below the national laboratory are reviewed and approved by the national laboratory. In the U.S. there exists no formal government hierarchy of standardizing laboratories; we rely on informal, widely dispersed, voluntary action. Thus, each entity in the measurement arena decides for itself its calibration needs, identifies the sources to meet these needs, and operates quite independently of all other entities. Because there is no government calibration service outside of the NBS, each entity must decide whether to use the NBS or to use a commercial facility. The first step in this decision process is to determine whether the commercial facilities possess the required capability (i.e., can they make the required measurement with the degree of uncertainty necessary). Derived units of measure are often intimately linked with the method of their measurement. Commercial facilities should not be conceded the responsibility for defining such units by the way they measure them. If no commercial facility exists for the quantity to be measured or if the accuracy required exceeds the commercial facilities' capability, the only alternative is the NBS. The most difficult question, though, is that first step. There exists no authoritative reference of laboratories providing calibration services, of the quantities those laboratories can measure, nor the total uncertainty with which they can make the measurements. The NBS has intuitive knowledge of some of these labs but intuition is not the same as objective approval. Even the intuitive knowledge is useless; the NBS is naturally reluctant to name a laboratory felt to be capable because it may appear as an endorsement.

For one segment of the economy—industry—the services provided by the Bureau (calibrations, SRM's, technical training and seminars, etc.) are of increasing importance to the attainment of quality which is an essential ingredient to productivity improvement programs and to our success in international competition. The need for U.S. industries, defense contractors, consumer product industries, medical and health services institutions, and others, to improve product quality and productivity is almost universally recognized. To assure the required quality and reliability, continual assessments must be made on the product, processes must be monitored, inspections made, conformance to specifications, documentation and drawings must be verified, and examinations and analyses must be performed. At the foundation of all of these activities are measurements. As industry strives to improve its implementation of newly developed quality control methods it is counter productive to allow the foundations for those methods to be eroded. Last year the NCSL published the results of a survey into national measurement requirements (existing and projected needs) as a means of identifying a broad spectrum of present and near term improvements needed at the NBS. (A copy of that report will be provided separately.) Concurrently, but independently, the NBS initiated a study of its own which resulted in an initiative for $2.5M in this area of emerging technology and increasing capability. A review committee external to the NBS agreed with the need for this improvement; however, the need exists for the entire amount originally proposed which totalled something more than $13M. A comparison of the national measurement requirements report and the NBS original proposal for this initiative discloses a significant degree of agreement on the needs.

Some elements of the Bureau's measurement service needs are at the cutting edge of technology—millimeter wave, infrared and other radiant energy including lasers, etc.—while others are within the existing knowledge base. Both types exist in the national measurement requirements report and in the original proposal for the calibration initiative.

The conduct of measurement-related seminars remains of singular importance to our industrial membership. While it is true that fees for this vital activity usually cover the cost to NBS to provide it, it is also true that key individuals are often diverted from other essential tasks in order to prepare and deliver the course material. As this relates to manpower ceilings as much as to the magnitude of the budget it might be appropriate to include a "level of effort" amount of funds and heads to support this role. Whether the full amount of this "level of effort" is recoverable from users in any given time period is not known; over the long term much (if not all of it) would be thru appropriate fees.

RECOMMENDATIONS

We urge this Committee to strongly consider the following proposals as it deliberates this budget: (1) Restore the $1.2M for MAP R&D and reprogram the funds to calibration services quality control and documentation; (2) Increase the calibration services initiative to $13.5M to include all elements originally studied by the review committee; (3) Restore the $100K for SRM development; (4) Review the policy of cost recovery for R&D based not so much on what may happen to demand but on the fact that such expenditures benefit the nation as a whole and at some future time; and (5) Determine an appropriate budget, with manpower ceilings, for seminars and training.

In this consideration we hope that you will bear in mind the mission of the NBS—and in particular the Organic Act's statement that the functions of NBS consist in: ". . . the custody of the standards; the comparison of the standards used in . . . manufacturing [and] commerce . . . with the standards adopted or recognized by the Government . . . [and] the solution of problems which arise in connection with standards . . ." The Organic Act also required a "reasonable fee" be charged for comparisons and calibrations.

The NBS has grown considerably since the Organic Act was made law in 1901—grown physically and in capability, in credibility and in mission. But, in growing, nothing has occurred which has reduced or eliminated the need which gave rise to the NBS: a requirement for a national standardizing laboratory purposed to assure fairness in commerce and interchangeability in manufacturing.

Precision measurements are a basic aspect of every area of science and technology. However, without a continuing research and development effort at the National level into all components of measurement; without an effective and practical delivery system to the Nation's Industry of the results of this R&D effort; without a strong and viable National Measurement System, the long-term impact to this country's leadership in high technology and this country's health, economy and security will be in jeopardy.

The NBS is a national asset; what is done to (or for) the NBS today will determine the health of that institution for years to come. We owe it to our future—the generations of tomorrow's users of NBS services—not to let its capability deteriorate further. We owe it to the present—the users of today's services—to upgrade its programs in calibration services and SRMs to meet the real needs which exist now.

United States Gypsum Co.,
Libertyville, Ill., February 13, 1984.

Hon. Bob Packwood,
*Chairman, Committee on Commerce, Science, and Transportation,
Washington, D.C.*

Dear Senator Packwood: I was shocked to learn that again this year the financial support for the Center of Building Technology (CBT) and the Center for Fire Research (CFR) in the Naional Bureau of Standards is omitted from the administration's proposed budget for FY 1985. I implore you to help Congress to restore the support of CBT and CFR as it did for fiscal year 1984.

It is unthinkable to destroy the only vestige of national concern for the future technical adequacy of buildings in America. These laboratories work diligently and cooperatively with other organizations, public and private to improve building practices. They develop technologies to predict, measure and test the performance of building materials, components, systems and practices.

I don't want to take your time to recite all the accomplishments of CBT and CFR but they are manifold in structural safety, computer integrated construction, earthquake hazard reduction, building physics, building equipment, quality of building materials, national laboratory accreditation program, fire hazards, toxicity of combustion products, etc. It is impossible to attract and keep the best staff for these programs with a vacilating and unsure financial support from year to year.

Our country needs to mainatain a stronger base in its building technology for the welfare and safety of its people. Where better can this be coordinated than in the National Bureau of Standards with its impartial and concerned effort for our citizens. I hope you will find a way to restore the budget items for the support of CBT and CFR and seek to find a more permanent way to guarantee this support on a permanent basis.

Very truly yours,

Lawrence T. Eby, Ph.D.,
Principal Associate.

Mineral Insulation Manufacturers Association,
Summit, N.J., February 13, 1984.

Senator Bob Packwood,
*Chairman, Senate Committee on Commerce, Science, and Transportation,
Washington, D.C.*

Dear Senator Packwood: The Department of Commerce has proposed the complete phasing out of the Center for Building Technology (CBT) and the Center for Fire Research (CFR) within the national Bureau of Standards. The members of the Mineral Insulation Manufacturers' Association, Inc., (MIMA), whose names are listed below, believe that elimination of these centers is unwise and that every possible effort should be made to preserve and continue these centers with adequate funding. We wish to submit the following for the record.

The Center for Building Technology is our country's only nonproprietary laboratory which can supply the type of research and development that cannot be obtained from private sources but which can stimulate private sector research as a result of its findings. The Center for Building Technology is the rallying point on insulation products, insulation systems, and thermal testing between industry, NBS, other government agencies, ASTM, ASHRAE and others. It is inconceivable that

Congress would consider leaving the United States as the only developed country without a national building research laboratory. This would be an irreplaceable loss to the building community, the nation, and the international research community.

Of particular importance to our industry in recent years is the provision by the Center for Building Technology of measured calibrated transfer specimens for use in conjunction with the "representative thickness" provisions of the FTC Rule, "Labeling and Advertising of Home Insulation", 16 CFR 460.6. Test data was generated by the 1000 mm line-heat source guarded hot plate; documentation was obtained regarding the test appropriateness and the theory of heat flow in thick insulations. MIMA provided a Research Associate to assist in this development at a cost of $50,000.

This program could not have been accomplished by private industry within the prescribed time limits. One insulation manufacturer with extensive research facilities invested in excess of $600,000, in 1976–1978 in research and development directed toward implementation of full thickness testing. They concluded that they were still not confident that full thickness testing was mature.

The FTC was urged by industry to defer its implementation of the full thickness testing section of its Rule until the NBS 1000 mm guarded hot plate and the related measured calibration transfer specimens were available. It was estimated that, in the fourteen months required to complete this development, manufacturers would be exposed to a rash of civic petitions for non-compliance with the test method than required by the FTC. This test method had already been determined by NBS CBT to be not feasible. Increased costs of industry for this immediate compliance, which would have had to be passed to the consumer, were estimated to be around $90 million for the fourteen month period.

Other activities by the Center for Building Technology of importance to the mineral fiber insulation industry:

(a) Thermal wall mass study: an independent evaluation to predict the effect of wall mass on energy use.

(b) Development of thermal test methods for building and insulating materials that will determine their thermal properties as required for cost-effective materials selection and building envelope design. (The Calibrated Hot Box).

(c) Development of techniques to assess the airtightness in houses.

(d) Development of diagnostic procedures, measurement techniques, and interpretation methods for in-situ assessment of the thermal integrity of building envelopes.

(e) MIMA was one of the instigators of the NVLAP program relating to insulating products. The Center for Building Technology's inspection of apparatus and standard testing procedures under the program is, again, an important non-proprietary contribution to the establishment of quality assurance for buildings.

(f) The activities of the Building Physics Division in the interests of energy conservation are too numerous for specific mention. This independent research, accomplished by no other organization, is of immeasurable help in providing the consumer, the designer, the builder, and the building industry with unique data.

MIMA appreciates the opportunity to submit its opinions to your committee. We urge that Congress restore appropriate funding to both the Center for Building Technology and the Center for Fire Research.

These elements within our nation's sole national building research laboratory must continue to work on R&D projects to provide the information needed by Federal Agencies interested in building and to provide technology that private industry alone cannot provide.

Sincerely yours,

SHELDON H. CADY,
Executive Vice President.

THE DOW CHEMICAL CO.,
Midland, Mich., February 21, 1984.

Senator SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space,
Washington, D.C.

DEAR SENATOR GORTON: I am writing to you as Chairman of the Network User's Association (NUA) standards committee. The NUA is primarily composed of large corporations from across the country representing many different categories of businesses. The common thread among the members is the use of computer networks as an integral portion of their computer systems.

Computer networks are the glue for the large computer systems of today, and will be the means of interconnecting all computers in the world within the decade. Computer network links into homes will be as common as cable television links are today, and will probably be offered by those same companies as a regular service. These networks will soon be as important to every home computer user as they are to the large companies in the NUA. The computer network business will be one of the major businesses in this country, and the groundwork for the multi-billion dollar industry is being laid now.

The primary goal of the NUA is the promotion of national and international networking standards. The NUA was founded because of the slow progess of the voluntary standards organizations that were chartered with setting these standards. The standards organizations are primarily composed of companies with business interests in those areas. Users very seldom participate to any great extent because the topics are only incidental to their business and it is difficult to cost justify the manpower and travel expenditures involved. By bringing users together we are able to present a common voice to the many standards organizations and assure ourselves of users needs being met without having to directly participate in the groups setting standards.

In our first meeting, held in Seattle in July of 1981, we reviewed the activities of all the major standards setting bodies and unanimously endorsed those efforts of the National Bureau of Standards (NBS) being performed by their Institute of Computer Science and Technology (ICST).

The resolution reads:

> "Recognizing"
>
> 1. that the National Bureau of Standards (NBS) is attempting to develop computer network protocol standards acceptable to major standards organizations world-wide,
> 2. that NBS is responsive to the requirements of the private industrial sector as well as federal agencies, and
> 3. that versions of the NBS Transport and Session protocols are already undergoing testing:
>
> the Network Users Association (NUA) strongly supports the computer-network protocols standardization efforts of NBS and intends to work with NBS in assuring that the requirements of its members are encompassed in the NBS development process. The NUA requests the federal government to continue strong support for the NBS efforts which are of great value to U.S. Industry as well as federal agencies. The NUA further requests that vendors implement the NBS computer-work protocol standards as quickly as possible after their finalization."

The Resolution speaks for itself, a good number of large scale computer system users are very much in favor of the NBS (i.e. ICST) protocols program and want it to continue. I am enclosing a list of the NUA members for the fiscal year that resolution was adopted. I believe you will agree the number and size of the companies interested in these computer network protocols are impressive.

Since the resolution was passed, the ICST efforts have been widely accepted by both manufacturers and voluntary standards organizations, bearing out our belief in the usefulness of those activities. However, the work completed to date is only the tip of the iceberg. There is much more remaining to be done, and without ICST to act as an impartial research laboratory and standards negotiator, I am confident the U.S. Standards efforts will return to their previous state of disarray.

The problem facing large scale computer system users in this country is very simple; we must have common protocols to enable our wide assortment of incompatible computing devices to communicate. The reason computer users have selected from a variety of manufacturers is that no one make of equipment can answer all the needs of a large company. Unfortunately, U.S. manufacturers are prohibited by law from researching and developing common products other than through voluntary standards organizations where a few dissenters can easily stalemate the process. Attempting to develop technical specifications in committees often spawns dissension that leads to deadlock. An outside source for technical development is almost mandatory. Without voluntary standards to use as a guideline, there will be no commonality of products within this country. European computer companies are not bound by the same laws as the U.S. manufacturers. The European Computer Manufacturers Association (ECMA) is rapidly developing the common protocols the users in this country require. European computer users will soon have the ability to mix and match their computer systems to achieve the capabilities and cost effectiveness they require. The large, multi-national companies of the NUA require the same resources to be price competitive in the world market.

If the ICST program is cut back the following may come to pass:

1. Progress in the Federal Information Processing Standards (FIPS) dealing with computer networks could come to a halt, eliminating a great potential source of computer cost savings for the federal government. The full annual budget for ICST could easily be lost in just one unnecessary procurement brought about because of the lack of the ability to share resources.
2. The catalytic effect of ICST in the voluntary standards programs in this country could be lost, with the potential impact of the fragmented U.S. standards effort resulting in Europeans taking the lead in the setting of international standards and quite possibly in the manufacturing of compatible products.
3. U.S. companies, to be cost competitive here and abroad, may have to purchase computer products from the Europeans and Japanese if U.S. manufacturers do not choose to implement standards oriented to other countries.

Considering the relatively small amount of money involved, cutting the ICST budget now could be an extremely risky business, with long-reaching implications. I urge you to consider the potential impact of any such cut, and hope you can see fit to restore the full ICST budget, if not increase it to enable ICST to better prepare itself for the next round of standards efforts.

The ball is now in your court. I realize the difficulty of trying to balance budgets in this era of cost cutting, but a cutback in this particular program will only cause greater costs for the federal government, computer network users, and U.S. computer manufacturers.

If I can be of any further assistance in this matter, please let me know. I will be delighted to contribute as much as possible to any effort to restore the ICST budget.

Sincerely,

MARVIN W. RAHM,
Chairman, NUA Standards Committee.

Attachment.

NUA MEMBERSHIP AND ASSOCIATE MEMBERSHIP, AUGUST 1981

Amjax
AT&T
Atlantic Richfield Co.
Avantek Inc.
Bankers Trust Co.
Bell Laboratories
Bell Northern Research
Bendix Corp.
Bolt Bernaek & Newman
Boeing Aerospace
Burroughs Corp.
Chase Manhattan Bank
Chemical Abstracts Service
Cities Service Co.
City of Seattle
Comsat General Integ. Sys.
Cray Research Inc.
Dept Supply & Services
Digital Comm. Co.
Digital Equipment Co.
Digital Technology Inc.
Distributed Arch. Systems
Dow Chemical Co.
Edunet
E-Systems Inc.
First City Trust
Ford Motor Co.
Four Phase Systems
General Electric
General Motors
Grumman Aerospace Corp.
GTE Products Corp.
Harris Corp.
Hewlett Packard Co.
Honeywell
IBM
Impact Information System
INTEL
Interactive Data Corp.
INTERLAN Inc.
Irving Trust
ITT Rayonier Inc.
John Fluke Manufacturing Co.
Lanier Business Products
Manufacturers Hanover Trust
Mini-Micro Systems
Mitre Corp.
National Bureau of Standards
Network Systems Corp.
Nixdorf Computer
OMEX
Peoples National Bank of Washington
Plantronics Zehntel
Polysar Ltd.
Rainer National Bank
Rolm Corp.
Safeco Insurance Co.
Salt River Project
Sandia Laboratories
Satelite Business Systems
Seafirst Corp.
Seattle First National Bank
Security Pacific National Bank
Siemens AB
Standard Oil Co. (Indiana)
Systems Engineering Laboratory
Sytek, Inc.
Tektronix Inc.
Teletone Corp.
Travelers Insurance Co.
TRT Telecommunications Inc.
TRW

TRW/ISD
U.S. House of Representatives
Ungermann—Bass
University of Saskatchewan
Wang Laboratories
Weyerhaeuser Co.
Xerox Corp.
Zilog
3 Com Corp.

JOHN J. MCMULLEN ASSOCIATES, INC.,
Arlington, Va., February 23, 1984.

Senator SLADE GORTON,
Washington, D.C.

DEAR SENATOR GORTON: I remember with pleasure the dinner Bob Blackwell organized last May 24th at which Marine Industry representatives enjoyed hearing your views on politics and the American Merchant Marine. Unfortunately the plight of U.S. bulk shipowners has become even more distressing than it appeared last spring. While one can applaud the Reagan Administration's return to relying more on individual responsibility it is distressing to see the detrimental impact on the commercial marine business caused by his administration's lack of understanding of how other maritime nations maintain their merchant marine. The U.S. bulk shipowner's confidence has been severly shaken by actions such as the CDS payback and resistance to cargo equity programs.

John J. McMullen Associates, Inc. is not a shipowner but is one of the world's largest naval architectural firms. The company designs many ships for the U.S. Navy and for commercial clients. As a major technical firm, we are interested in both the health of the marine industry and in another area of interest to you, the development of computer software standards. We have formed a company computer standards committee to further improve our extensive use of computers for both business and technical analysis and design.

I was distressed to hear that the budget for the Institute for Computer Sciences and Technology (ICST), Bureau of Standards has been cut for the coming fiscal year. As an ADP equipment user, JJMA believes that the work the institute performs in the area of hardware and software standards is important in promoting the compatibility and portability of existing ADP equipment and accompanying software.

The standards and guidelines published by ICST are utilized by private industry as well as the Federal government. ICST sponsors workshops and conferences which are well attended by private industry personnel, further promoting the transfer of high technology from government to industry.

JJMA has a Seattle office which serves both U.S. Navy and commercial clientele. We wish you good fortune in supporting Puget Sound area marine enterprises.

I look forward to seeing you at future marine industry functions.

Very truly yours,

RICHARD W. THORPE,
Executive Vice President.

DRAGON SYSTEMS, INC.,
West Newton, Mass., February 28, 1984.

Senator BOB PACKWOOD,
Washington, D.C.

DEAR SENATOR PACKWOOD: There is a critical need for adequate funding levels in fiscal year 1985 for the National Bureau of Standards, Institute for Computer Sciences and Technology.

The proposed administration budget cut would largely preclude the realization of meaningful data processing standards so essential to both the creators and consumers of computer technology. There is scant evidence that the highly competitive and partisan private sector, will suddenly join arms and adopt statesmen-like attitudes in any all-voluntary standards setting process.

As a specific example, let me address the speech technology area in which I have been deeply involved for many years, and for which there are no standards. In the automatic speech recognition area alone, there is a rapidly burgeoning array of products, with system prices ranging from under $600 to over $60,000. Virtually all vendors "claim" performance at 99 percent or better—on tasks, in fact, which in the absence of standardized measures, are ill-defined and certainly not comparable. In two different direct tests of the commercial systems available actual system performance varied quite widely. Customer procurements in the absence of standards for this sophisticated technology fall easy prey to deceptive claims.

After a decade's history of largely inactive but highly argumentative "standards" activities within the speech technical community, meaningful output has been almost nil. By sharp contrast, however, the Institute for Computer Sciences and Technology at NBS in March, 1982 sponsored a Workshop on Standardization for Speech I/O Technology which attracted excellent representation and effective participation from government, industry, and academia. As an outcome of that event, ICST has succeeded in initiating the first steps in meaningful consensus speech I/O standards. A draft Guideline for Speech Recognition Performance Evaluation generated through ICST is presently completing development and review. The fulfillment of these as well as the companion speech data base standards will be abruptly aborted without the continuing support of ICST.

Government military and non-military applications for speech I/O with synthesis, recognition, verification, and compression are extraordinarily broad. Significant increases in human productivity, security, intelligence, automatic machine control, and communications have already been clearly demonstrated with this rapidly maturing technology. In the unlikely event that the private sector were to develop realistic and timely standards, it is difficult to conceive that the U.S. government, probably this country's largest customer for this technology, would knowingly opt for having no voice in creating these standards.

The implications of an en masse government abandonment of realistic computer technology standards in today's society are truly staggering. Given this context, the present administration's proposed ICST budget cuts are not only manifestly "penny-wise and pound-foolish" but potentially dangerous. Abdication of government responsibility for effective coordination in the development of critical standards and the relevant research necessarily assumes an inappropriately severe and suboptimal strategic position.

Sincerely yours,

JANET M. BAKER, Ph.D.,
President.

MACBETH,
A DIVISION OF KOLLMORGEN CORP.,
Newburgh, N.Y., February 29, 1984.

Hon. SLADE GORTON,
Subcommittee on Science, Technology, and Space, Senate Committee on Commerce, Science, and Transportation, Washington, D.C.

DEAR SENATOR GORTON: A recent brief publication "NBS Update" called to my attention the apparent intention to reduce or eliminate funding for measurement assurance programs and the national voluntary laboratory accreditation program at the National Bureau of Standards. Such a move would be unwise. Through these programs the National Bureau of Standards enlists the cooperative efforts of industry laboratories. This is the most efficient way known to amplify the effectiveness of the work of the Bureau. As major manufacturers of color measurement and control equipment for industry, we have a substantial interest in optical measurements, but my concern goes beyond the immediate interests of our company, to the impact of our national government taking such a backward step on the path to efficiently organized methods of standardizing optical measurements. I hope this expression of my point of view is useful to your committee.

Very truly yours,

C. S. MCCAMY,
Vice President for Research.

UNDERWRITERS LABORATORIES INC.,
Northbrook, Ill., February 29, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR SENATOR GORTON: The budget proposal sent to Congress by President Reagan includes a total of $126.1 million for the Commerce Department's National Bureau of Standards (NBS), representing a net increase of $10.4 million from the NBS current appropriation of $115.7 million.

My concern is that despite the proposed increase, the Center for Fire Research is scheduled for elimination. If this comes about, a number of programs which represent potentially major breakthroughs in reduction in loss of life and property from fire will be aborted. They will be aborted because the NBS Center for Fire Research has provided the initiatives in terms of testing and data development, scientific analysis, computer programming and information dissemination to the technical community for advancement of these programs.

One of the more important programs is the mathematical modeling of fires. I speak from personal experience in stating that present methods of planning building design for fire safety are cumbersome, limited and expensive. NBS has spearheaded the experimental work and coordination of technical developments which are putting in place a mathematical approach that will substitute for expensive fire testing which yields limited results. This approach is no longer simply a hope of theorists. It will come to fruition, but it will suffer a terrible setback without the Center for Fire Research. I do not know of any organization in the private sector whose scope of interest is sufficiently broad to justify taking on this project.

Another keen area of interest is the issue of deaths resulting from toxic gases generated by unwanted fires. All experts agree that the preponderance of fire deaths results from exposure to toxic gases. Is this problem solvable? Can selective choices of materials used in buildings reduce fire deaths of this type? The answers to these questions involve serious economic consequences to material suppliers and building designers. Consequently, the issue is controversial, emotional and unresolved.

The Center for Fire Research has provided an unbiased forum for discussion of the toxicity problem. The Center has developed a test for determining relative toxicity under specified conditions. Beyond that, the Center has pulled together the parties of interest in seminars and other meetings to review current information and to find a solution. As a division of a Federal Agency, the Center has effectively served in the role of a neutral but knowledgeable leader in this effort.

The recent contributions of the Center to design of fire protection for nursing homes, advancement in automatic sprinkler protection, development of tests for material characteristics, prediction methodology for fire resistance of structural members, and other scientific and technical developments, are tangible evidence of the effectiveness and practicality of the bureau's work in the fire area.

This work will not likely be assumed by the private sector, as I mentioned previously, and, in most other developed countries, fire research is conducted by governmental agencies. This type of research should be continued by the Center for Fire Research. I make this recommendation as President of Underwriters Laboratories, a private laboratory conducting more fire testing, in all probability, than any other organization within the United States. Our work, like much of that in the private sector, is oriented to specific products and consists of practical but narrowly oriented efforts. We look to the Center for Fire Research for leadership in developing the scientific and theoretical information on which practical implementation of engineering knowledge can be based. It would be a terrible setback if this source were eliminated, not just for Underwriters Laboratories but for the fire community.

I understand that the Federal Government, just like our organization, must make difficult choices regarding use of its resources. In making this particular choice, it is my belief that the Center for Fire Research should receive a high priority because, as covered in this letter, it serves a unique and specialized need, not furnished by the private sector, and it has a track record of accomplishment.

Cordially,

JACK BONO, *President.*

COUNCIL FOR OPTICAL RADIATION MEASUREMENTS,
RENSSELAER POLYTECHNIC INSTITUTE,
Troy, N.Y., March 1, 1984.

Hon. SLADE GORTON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR GORTON: I am writing on behalf of the Council for Optical Radiation Measurements (CORM), a nonprofit group organized to advise the National Bureau of Standards on national needs in optical radiation measurements. CORM consists of about 150 representatives from industry and universities concerned with measurement and standardization techniques in this field.

My purpose in writing for CORM is to request the serious consideration of your subcommittee to restoring NBS MAP funding and to funding the NBS Process and

Quality Control budget initiatives for fiscal year 1985. CORM feels that a serious problem would be introduced by the planned reduction and elimination of these sources of funding over the next few years. At the same time that this support for optical radiation measurements at NBS is being phased out, CORM in their Fourth Report to NBS and the National Conference of Standardizing Laboratories are both urging NBS to provide more support to commerce and industry by helping to establish primary and secondary standardization laboratories as part of a national standardization program. Such a program would reduce the burden of routine services and make possible more efficient use of the very limited staff devoted to optical radiation measurements, but its establishment will be impossible without the funding being requested.

The members and directors of CORM are convinced that the services of NBS in the area of optical radiation measurements are of great value, not only to CORM, but to a large segment of U.S. industry. Those of us associated with CORM Hope it will be possible for you to give serious consideration to this request.

Sincerely yours,

Fred W. Billmeyer, Jr.,
Director and Past Secretary, CORM.

Duro-Test Corp.,
North Bergen, N.J., March 2, 1984.

Hon. Slade Gorton,
U.S. Senate,
Washington, D.C.

Dear Senator Gorton: It has come to my attention that your subcommittee on Science, Technology and Space currently has the National Bureau of Standards budget under review and we are concerned about any possible reduction in funding for the Measurement Assurance Program (MAP) so necessary to relatively small companies like our own.

Duro-Test (cf. annual report enclosed) has been for over twenty years and continues to be heavily dependent upon NBS in the field of optical (spectrophotometric and spectroradiometric) measurements, standards and standard procedures. This work at NBS has been partially supported by MAP money—unfortunately at too low a level. Any reduction in MAP funding which would force NBS to seek full cost recovery of services through users could unfairly penalize companies our size since, as I understand, it could result in a doubling or tripling of fees.

More work, not less (e.g. process and quality control measurements initiative) needs to be done by NBS in the area of light measurements as evidenced by the demonstration over the last few years of important medical and health related effects of not only special lighting but general lighting (both natural and artificial) in schools, offices and factories as well. Such effects range from induction of cancer to the relief of depression and the improvement of productivity and general well being of people. These are serious and important issues which are contemplated for a symposium planned by the New York Academy of Sciences late this calendar year.

Light is an environmental factor every bit as important and ubiquitous in both its natural and artificial forms as the atmosphere and oceans, which clearly have the federal government's attention (i.e. NOAA). The accurate measurement of the spectral, radiometric, photometric and geometric aspects of light is fundamental to the understanding and use of light. NBS should be generously supported in this by the people of the country collectively as they are really the ultimate beneficiaries.

I will be pleased to supply light-related scientific publications by renowned scientists as back-up material if this could be helpful.

Sincerely yours,

Luke Thorington.

Boeing Computer Services,
Seattle, Wash., March 5, 1984.

Senator Slade Gorton,
Committee on Commerce, Science, and Technology, Subcommittee on Science, Technology, and Space, Washington, D.C.

Dear Senator Gorton: I am delighted that you are still heading the Subcommittee on Science, Technology, and Space. These topic areas are very critical to the future of the United States, as the high technology revolution is potentially more important to the future of this country than was the industrial revolution.

A year ago, I wrote you requesting the drastically-cut budget of the Institute of Computer Science and Technology (ICST), working under the National Bureau of Standards (NBS), be restored. Thanks to the efforts of you and your staff, the ICST budget was brought back to its originally proposed 1983 level, and that organization was able to continue the work that has proven so critical to industry, in general, and The Boeing Company, specifically.

Once again, ICST is undergoing a budget cut-back, at a time when their work is acknowledged both within NBS and throughout the world. Once again we would like to request that the ICST budget be restored to its former level. In fact, I would like to urge that the budget be brought back to its 1982 level, before the economy driven cut-backs of 1983 came into being. Not only is it necessary that the ICST work continue, but it is important to both the federal government and private industry that this work be extended to expand technology areas such as Software Engineering, which has been identified as one of the most critical technologies The Boeing Company will require by the 1990s.

I have included the attachment which was submitted with my letter dated February 21, 1983. I hope you will be able to do the same fine job you did last year, and restore the ICST budget, hopefully, to its pre-recession-days level.

Sincerely,

R. L. DRYDEN.

Attachment.

THE IMPORTANCE OF ICST IN THE STANDARDS PROCESS

ICST and Boeing Computer Services Company both belong to the American National Standards Institute (ANSI). ANSI is the principal standards setting institution in the U.S., and the U.S. representative in the International Standards Organization (ISO). ICST, like Boeing Computer Services Company, uses ANSI standards when they are available. However, in the world of computer technology, the requirement for standards has outpaced the ability of standards organizations to keep pace. ICST has been able to fill that gap by developing specification which are consistent with technology trends, are a consensus of approaches to the problems they address, and are generally acceptable to both manufacturers and users alike.

The output of ICST is fed back into the standards process and, in many cases, has become the base for new ANSI and ISO standards. The recently introduced ISO Transport Protocol Specification is a prime example. The transport protocol is a key ingredient in computer communications and, without ICST's input, this key computer software standards progress would have been delayed by many years.

ICST is now serving a key role in encouraging the implementation of Transport Protocol by computer manufacturers. They are also developing specifications for other communication elements and feeding them back into the system just as they did for transport. These efforts not only speed up the standards process, but also assure that U.S. position is clearly defined and is recognized in the international standards arena. Boeing Computer Services Company, like many other major U.S. companies, has always given ICST their full support in this effort and continues to do so.

The standards ICST are doing so much to develop are absolutely necessary for large multi-national companies, such as The Boeing Company, to compete in the world market. As you know, the Boeing Company's major competitor in the aircraft business is Airbus International, which is owned by several European governments. To overcome the political advantage this gives our competitors, we must be as efficient as possible in all areas, and the effective use of computers is an absolute necessity in this highly competitive environment. If ICST were to cease setting the pace for standards development, and were unable to encourage early U.S. implementation of those standards, the European manufacturers would rapidly take the lead. This would result in two problems: international standards would not be as oriented to U.S. requirements; and European systems would be implemented earlier than U.S. systems, giving our competitors more sophisticated and cost effective systems.

We have watched the Japanese step in and dominate the automotive market, while U.S. manufacturers stood by helplessly, unable to rise to the challenge. This same scene could be replayed in the computing industry, in which the U.S. has only a tenuous lead. Only in this case, the chellengers are both the Japanese and the Europeans. U.S. business must have the best in computer technology, and if our manufacturers fall behind in their product offerings, U.S. business will be forced, by economic necessity, to purchase the systems which allow them to compete in a world market.

Our participation in ANSI has given us a historical perspective on the ability of the U.S. to develop the standarized computer systems U.S. business requires. Without ICST to act as a catalyst, there is little hope that U.S. manufacturers will be able to supply the integrated resources we require, and that we see being developed in Europe today. Instead of the ICST budget being cut to an amount barely able to pay for the cost of the facility, it should be increased to allow for preparation for the next computer battleground, application software. ICST must begin staffing to research the future problems in this area, such as data mangement, which is a topic of tremendous importance to the private sector as well as to the federal government.

ROCHESTER INSTITUTE OF TECHNOLOGY,
Rochester, N.Y., March 15, 1984.

Senator SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

HON. SENATOR: In addressing this letter to you I am asking you to do all that is in your power to restore MAP money and direct it to the National Bureau of Standards spectrophotometry efforts.

It is evident to those of us, both in industry and in academia, that the funding for badly needed spectrophotometric activity at the National Bureau of Standards has been curtailed little by little and year by year. This, of course, is fairly detrimental for all of those needing traceability and standards in spectrophotometry, and this is particularly true for many industries whose quality control operations depend to a large degree on spectrophotometric measurements. By spectrophotometry we mean the quantitative application of measurements of spectral transmittance, reflectance and luminescence, and related quantities in the near-ultraviolet, visible and near-infrared wavelength regions. This type of metrology is of vital importance to many materials producing and using industries for research and development and for quality control; to many operations involving clincial analysis; and to the analysis of many processes and materials related to energy conservation, to name only a few applications. In academic laboratories, such as the Munsell Color Science Laboratory here at RIT, there is a need for a good liaison with NBS via Measurement Assurance Programs with an aim to provide means and methods for the intermediate standard laboratories which can implement some of the work of the National Bureau of Standards and thus alleviate some of the burden from the Bureau. Only in this way, and together, can we establish a badly needed national measurement standardization system for spectrophotometry.

The national system of measurement in spectrophotometry presently lacks the availability of key calibration and measurement quality assurance tests that are needed for effective, equitable control of spectrophotometric metrology without unnecessary economic burden.

It is for this reason, dear Senator, that we here urge you to restore the Measurement Assurance Program for the National Bureau of Standards efforts in spectrophotometry. Believe that this is the conditio sine qua non for moving and establishing a sound national measurement standardization system for spectrophotometry and to eventually transfer some of the burden from the National Bureau of Standards to industry and academia.

Very truly yours,

DR. FRANC GRUM.

CHAMBER OF COMMERCE OF THE UNITED STATES,
COMMUNITY DEVELOPMENT SECTION,
Washington, D.C., March 5, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space, Senate Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR SENATOR GORTON: On behalf of the approximately 200,000 members of the U.S. Chamber of Commerce, I want to state our continuing support for the Centers for Building Technology and Fire Research within the National Bureau of Standards. Both organizations are making valuable and unique contributions to solving the scientific and technical problems facing the construction industry.

The Center for Fire Research faces a more difficult task today than when it was established a decade ago. The increasing chemical complexity of building materials and the furnishings placed in homes and offices have combined with more tightly constructed buildings and more energy efficient heating and air conditioning systems to create the need for further research on controlling fire hazards and with the impact of fire in this changing environment.

The Center for Building Technology is a vital resource in providing the scientific basis for building code reform and improving construction productivity. The Center also plays a key role in helping to establish the facts when questions on materials or systems performance arise in the building community. In our enclosed statement to the House, we specifically highlight the Center's role in the Federal Trade Commission action on insulation testing and labeling and the important contribution the Center for Building Technology made in analyzing the Hyatt Hotel tragedy in Kansas City.

The Center for Building Technology and the Center for Fire Research serve as independent sources of information for all sectors of the construction community. While part of their funding can and should come from other federal agencies and elements of the private sector concerned with building issues, their recognition as an objective factfinder requires them to have a degree of financial autonomy. Therefore, it is necessary that both centers continue to receive direct appropriations as part of the National Bureau of Standards' budget.

I hope you and the members of your subcommittee will work to assure continued funding for these organizations. I regret we did not have the opportunity to present our views to you at your hearings on the National Bureau of Standards. Enclosed for your review is a copy of our statement to the House Subcommittee on Science and Technology that also reviewed this issue.[1]

If you have questions on our position, please feel free to contact me.

Sincerely,

WILLIAM D. KELLEHER,
Manager.

HEALTH INDUSTRY MANUFACTURERS ASSOCIATION,
Washington, D.C., March 6, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: The Health Industry Manufacturers Association (HIMA) wants you to know its views on two National Bureau of Standards (NBS) reauthorization issues. Those issues involve NBS initiatives in the areas of Process and Quality Control Measurements and Industrial Applications of Biotechnology.

HIMA is a national trade association representing 320 manufacturers of medical devices and diagnostic products. While most of our members are small companies—two-thirds have annual sales of less than $10 million—they manufacture more than 90 percent of domestically produced medical equipment and supplies. Our members' products range from simple patient aids, such as walkers and canes, to sophisticated, high technology items, such as monoclonal antibodies.

Process and Quality Control Measurements.—HIMA supports this NBS program for the development of new physical measurement and calibration services. Besides making highly sophisticated instrumentation for medical use, our members rely on precision electronic instrumentation and test equipment for their own manufacturing processes. NBS programs such as this not only help ensure the production of high quality medical equipment, but also add an important measure of safety in such areas as radiation therapy and sterilization.

Our industry respects NBS' leadership in physical measurement and calibration and believes that Congress should approve this initiative.

Industrial Applications of Biotechnology.—The proposed NBS biotechnology program is important and should be supported by Congress. Many of our members are using biotechnology techniques to develop new products that will revolutionize the way we identify and treat disease. For example, you may be familiar with the Seattle firm, Genetic Systems Corporation, which produces monoclonal antibodies.

While the U.S. is a biotechnology leader, it will face strong competition in the race to commercialization. The Office of Technology Assessment recently found that generic applied research is currently insufficient to support rapid commercialization of biotechnology. Through programs such as that proposed by NBS, Congress can help develop a scientific basis for the commercial use of biotechnology, assure the rapid transfer of biotechnology from the laboratory to medical practice, and facilitate continued U.S. leadership in this exciting area.

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[1] Retained in committee files.

HIMA believes both NBS initiatives will improve not only manufacturing processes, but patient care. We urge your support.

Thank you for considering HIMA's views. If you would like any additional information, please call me or have your staff call Richard Flaherty in my office.

Sincerely,

FRANK E. SAMUEL, Jr.,
President.

GENERAL ELECTRIC CO.,
RESEARCH DEVELOPMENT CENTER,
Schenectady, N.Y., March 7, 1984.

Senator SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space,
U.S. Senate, Washington, D.C.

DEAR SENATOR GORTON: I was shocked to hear that, for the second year in a row, congressional hearings are in progress to determine whether the research programs of the Center should be eliminated. For nearly twelve years, I and people in my group have been involved with the chemical and testing aspects of the flammability of plastics. Throughout this period, I have felt that CFR has been the premier laboratory in this country, and perhaps in the world, especially in the following areas: Fire Testing, Fire Modeling, Smoke Control, Fire Safety Evaluation, Arson Detection/Prevention, Exploratory Fire Research, and Combustion Products Toxicity.

For the past five years, I have been a member of National Research Council Evaluation Panel for the CFR and have had an opportunity to review their current programs and compare their work with that of other private and academic laboratories. This exposure has only reinforced my high opinion of the Center.

In the past four years, there has been a steady decline in fire research in this country even though the USA still ranks number one in the world in fire deaths and fire losses. For example, the U.S. National Fire Protection Association reports the annual fire toll at 12 thousand deaths and a fire cost of $4 billion. The only hope of changing this record is to maintain the viability of the Center of Fire Research.

Please advise me of the outcome of your committee's deliberations on this matter.

Sincerely,

ARNOLD FACTOR,
Manager, Polymer and Surface Stabilization Unit,
Chemical Reactions and Systems Branch, Chemical Laboratories.

TURNER CONSTRUCTION CO.,
New York, N.Y., March 12, 1984.

Hon. SLADE GORTON,
Senate Subcommittee on Science, Technology, and Space,
Hart Senate Office Building, Washington, D.C.

DEAR SIR: I understand that the Department of Commerce has recommended the elimination of funding for the Center for Building Technology.

Turner Construction relies upon engineering practices based on research done by the National Bureau of Standards (NBS) to build safely and economically. NBS information on loads acting during construction and on the resistance of temporary structures helps us avoid the losses of life, property, and time that can result from failures during construction. Similarly, NBS studies of methods to predict the performance of building materials, components and systems, and to measure this performance in the factory or at the construction site, help to assure the usefulness, safety and economy of buildings. It is not possible for individual firms, or even trade associations to conduct this research, since results must be widely shared in the building community and since benefits are shared by all members of the building community and by the general public.

We are concerned to learn that the Administration's budget proposal for fiscal year 1985 would eliminate funding for the Center for Building Technology and the Center for Fire Research at NBS.

The rationale for the proposed reduction is that these programs are more properly the role of the private sector and State and local governments. We note that testimony at the hearings on February 7, 1984, of the House Subcommittee on Science, Research and Technology, by the Chamber of Commerce speaking for the private sector, by the National Conference of States on Building Codes and Standard speaking for State and local governments, and by the National Institute of Building Sciences speaking for the whole building community, contradicted this rationale and called for continuation of these vital programs. We hope that you will support continuation and strengthening of these programs as you consider the authorization and appropriation legislation for NBS.

Very truly yours,

EDWARD P. CLARKE,
Vice President, Corporate Operations.

HEWLETT-PACKARD CO.,
Palo Alto, Calif., March 13, 1984.

Senator SLADE GORTON,
Chairman; Subcommittee on Science, Technology, and Space; Committee on Commerce, Science, and Transportation; Washington, D.C.

DEAR SENATOR GORTON: We wish to express our company's concern about a recent decision by the Department of Commerce to reduce the proposed budget of the National Bureau of Standards by an amount of approximately $1.7M in the area of Measurement Assurance Programs (MAP) and National Voluntary Laboratory Accreditation Program (NVLAP).

The DOC direction is apparently based on the Administration guideline that government services with identifiable users should bear the cost of those services.

We certainly agree with the principle of recovering all service costs. However, it is quite a different matter to charge for the research function to invent and establish these important high technology calibration services. We feel it is the function and responsibility of NBS to fund the fundamental research necessary to establish and disseminate standards for the U.S.A. National Measurement System.

A leading instrumentation manufacturer like Hewlett-Packard must rely on NBS measurement services and pay those fees. We also must have new services offered in microwave measurements to support new technologies such as noise and power standards at microwave and millimeter frequencies. This traceability is demanded by our aerospace and commercial customers worldwide and at the heart of both military (electronic warfare) and commercial (communications) applications.

Various Hewlett-Packard metrology labs have participated in the MAP program and have encouraged NBS to extend the program into certain other microwave measurements. Actually, the NBS needs more budget and research attention to MAPS and their dissemination rather than the cut proposed by DoC.

A preferred alternative would be a non-identified cut of $1.7M in the whole NBS budget which would allow their management to reallocate total priorities based on knowledge of national measurement requirements.

Sincerely,

WILLIAM E. TERRY,
Executive Vice President.

NATIONAL FOREST PRODUCTS ASSOCIATION,
Washington, D.C., March 15, 1984.

Hon. SLADE GORTON,
Chairman, Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: The National Forest Products Association (NFPA) is concerned over the lack of funding in the Administration's budget for fire research programs at the National Bureau of Standards (NBS). We request that NFPA's views be considered and made part of your hearing record on this issue.

The National Forest Products Association is a federation of over 2,500 lumber and wood products associations and producing companies throughout the United States. As part of the services provided to this membership, we are extensively involved in the development of test standards, construction specifications, and building codes related to fire performance in buildings.

NFPA has maintained a long-standing working relationship with administrators and scientists at the NBS center for Fire Research. For nine years we supported a Research Associate at the Center and are now considering sponsoring a new program in another area of fire research. Because of this involvement, we are very familiar with NBS research capabilities in such diverse areas as mathematical fire modeling, fire performance testing and fire risk analysis.

NFPA believes the NBS Center for Fire Research serves a useful purpose in conducting basic exploratory fire research that is generally not conducted elsewhere in the United States. This basic research, once developed, can and should be reviewed and adopted for use by appropriate parties without undue influence and pressure from researchers, government, or industry. When utilized in this manner, NBS basic fire research programs are strongly supported by the wood industry.

In short, NFPA supports the Bureau's fire research activities, primarily in basic data development where results are presented for outside review and use. In this regard, we urge that the National Institute of Building Sciences, as authorized under Public Law 93-383, be assigned responsibility for analyzing the role of NBS involvement in fire technology and recommending specific areas of research need.

Continuance of Center for Fire Research activities within the overall budget constraints set forth by the Administration for NBS is strongly recommended.

Sincerely,

DAVID E. STAHL,
President.

[Telegram]

Hon. SLADE GORTON,
U.S. Senate, Hart Office Building, Washington, D.C.

DEAR SENATOR GORTON: Guildline Instruments, Inc. is a manufacturer of precision electrical measuring instruments, our customer base includes U.S. Aerospace, Academic, commercial and government agencies. Approximately 40 percent of our sales is outside of the United States.

We have been a user of the N.B.S. voltage measurement assurance program (M.A.P.) for three years. The most recent being completed in February 1984.

We are most concerned as to the effect of the reduction of 1.2 million dollars in the M.A.P. budget.

We at Guildline rely on the services that are provided by N.B.S. as do many other companies. This reduction specifically in the M.A.P. services, will have an adverse effect to our own quality assurance procedures. We could be forced specifically in support of our international business to take alternate steps to insure the required level of confidence in the quality of our products.

The United States must be conpetitive in the international high tech market. If U.S. manufacturers are forced to obtain services from outside the United States, our G.N.P. could be affected.

In addition I would like to point out that the services from N.B.S. be kept at a reasonable cost. I.e. we recently had N.B.S. recertify two standards of our manufacture at a cost of $797.00. Please note that our selling price for these instruments is $788.00. This means that our customers are forced to pay a higher cost for maintaining an instrument than the cost which they could purchase a new one. In addition, the cost for this same service through the Canadian National Research Council can be obtained by a U.S. customer for under $250.00.

We feel very strong concerning this reduction in budget and ask that you reconsider the possible ramification.

Very truly yours,

EDWARD NEMEROFF,
Vice President, General Manager,
Guildline Instruments, Inc.

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